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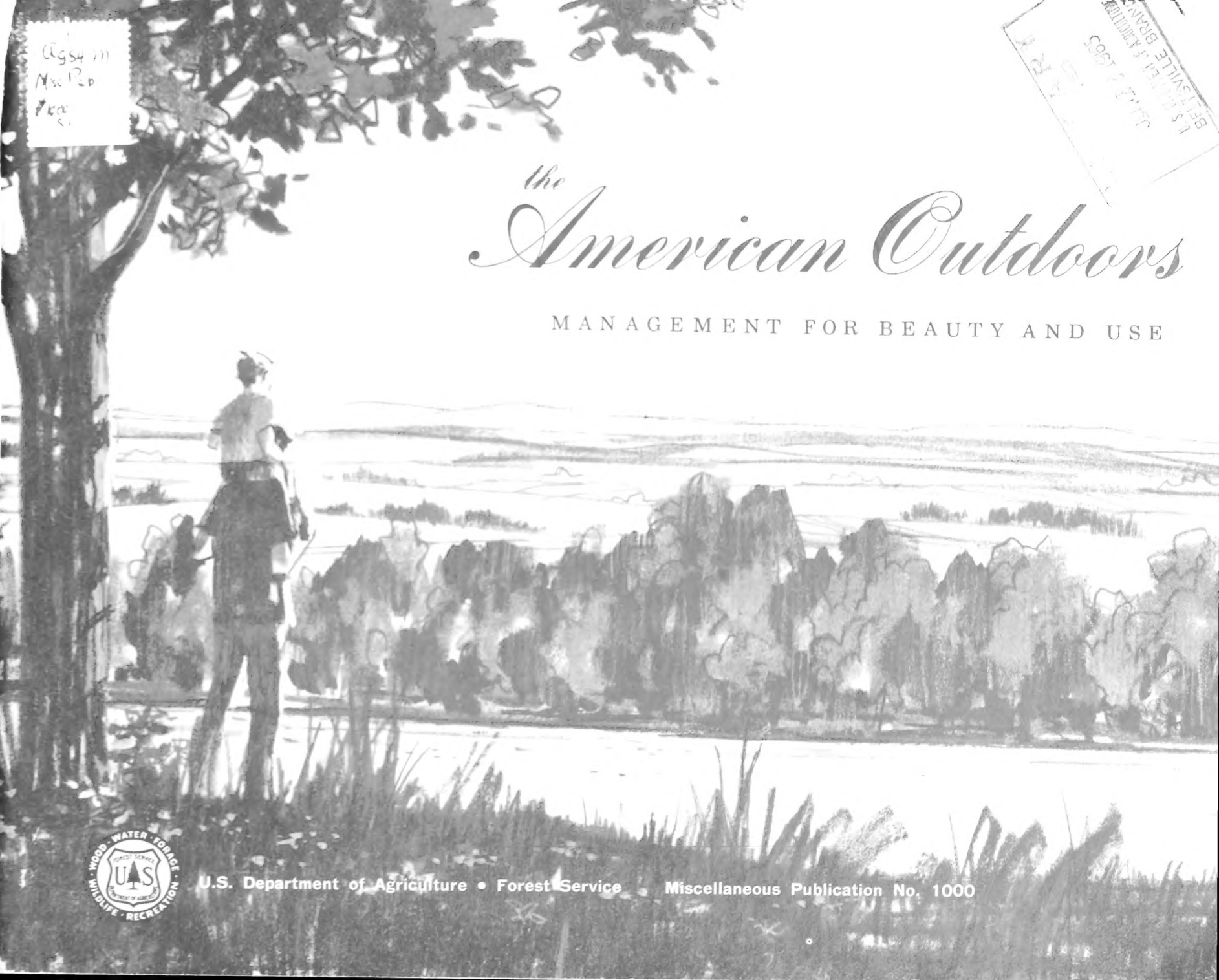
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U.S. FOREST SERVICE
BETTSVILLE BRANCH
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the American Outdoors

MANAGEMENT FOR BEAUTY AND USE



U.S. Department of Agriculture • Forest Service Miscellaneous Publication No. 1000

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All quotations prefacing major sections in this booklet are from the White House Message on Natural Beauty presented to the Congress February 8, 1965, by President Lyndon B. Johnson.



Our land is the canvas that bears the mark of our culture. It can be made a beautiful sight to behold, an expression of a civilization fully aware of its responsibility to maintain a close relationship with nature by cultivating it esthetically and productively.

One of the measures of our greatness as a society will be our sensitivity to beauty and how we apply it in all walks of life. The U.S. Department of Agriculture has been steadily developing ways and means of beautifying our rural areas. The Department's Forest Service, with its 60 years of experience in research and public land management, has accumulated much practical information that can be useful in maintaining or restoring the natural beauty of outdoor America. The information applies to field and farm, to range and woodland, to all places where man's hand alters the appearance of the landscape.

This booklet outlines some of the approaches to beautification along with use of the land. It also lists sources of further information and technical assistance. We hope it will be a helpful guide.

ORVILLE L. FREEMAN
Secretary of Agriculture



*“For centuries Americans
have drawn strength and
inspiration from the beauty
of our country.”*

A New Conservation

Few countries have been endowed with such an abundance of resources and natural beauty as the United States. The great outdoors was the setting in which our people developed and grew and built this mighty nation. The use of natural resources has enabled us to attain a position of economic well-being unsurpassed in world history. Now we have the opportunity as well as the responsibility to manage our resources for beauty as well as for use.

In his message to Congress on natural beauty, delivered on February 8, 1965, President Johnson presented a stirring challenge to all Americans. He called for a new conservation, a creative conservation of restoration and innovation. He said that this new conservation must be concerned with the relation between man and the natural world and that beauty and man's opportunity to enjoy it must assume a major role.

Natural beauty is perceived by all of us in the large grandeur of a wilderness, the small world of a pond, the stillness of a desert, the cry of birds in a flowering meadow, and all the other sights and sounds of the American outdoors. Over the years, the Forest Service of the U.S. Department of Agriculture, State Foresters, and other public and private resource managers have been developing a philosophy which integrates beauty with the managed use of natural resources. This philosophy includes an understanding of the productive forest and range at work in meeting human needs, and an appreciation of the harmonious interplay among the elements and uses of the forest environment. It emphasizes the fuller appreciation of beauty that comes when nature and land use are viewed with an understanding eye. This understanding sees elements of beauty, order, and design in natural scenes and in the everyday drama of resource use that might otherwise go unseen. Then every trip to the out-of-doors becomes more meaningful and enjoyable. The application of esthetic principles to land management gives form and substance to the philosophy of beauty and utility.

Those who heed the President's call to action will find much to be done and much to work with. Well-managed forests and rangelands can be the rule. Scenic and esthetic qualities of outdoor recreation areas can be improved. Highway corridors, structures, and trails can be made attractive through design, plantings, and maintenance. New travel routes can be located to display the most interesting features of the land and its use. Streams, lakes, and waterfront areas can be managed to preserve and enhance their natural attractiveness. And people can learn to understand and appreciate their outdoor environment in terms of beauty and use.

CONCEPTS OF BEAUTY FOR LAND USE

John Ormsbee Simonds, in his book "Landscape Architecture—the Shaping of Man's Natural Environment," says "There are relatively few areas that can be reserved in their pristine state or developed solely to display the most of their natural beauty. Man generally considers land in terms of use."

As part of our Nation's heritage, several million acres of wilderness, with their spectacular beauty, have been and will be set aside and maintained in their natural state for man's enjoyment. However, the present uses of other, more intensively managed lands may need to be altered to provide for beauty. In the future of forests and rangelands, their trees and other vegetation can play a significant role in the achievement of beauty. Their uses will have to be managed so that they function in an orderly and appropriate manner, and still remain a delight to the eye.

Those who would seek to capture or enhance natural beauty in the countryside can call upon three basic concepts often used by the environmental-planning professions:

■ **Variety.**—Variety produces that changing quality of the landscape that captures and holds one's interest. A continuing diversity or change leads one to anticipate something different and delightful around the next bend in the trail or beyond the next ridge. In planning for variety one should ask, "How will people use or view this?" Is it both functional and interesting,

or is it too much like that which has gone before? Variety is truly the spice of life, but it must not be allowed to run wild. It must be balanced with just the right amount of repetition to prevent chaos and confusion.

■ **Harmony.**—This may appear as a blending of natural or natural and man-induced features, a continuity of complementary shapes, textures, and colors, a smooth flow from one part to another. Harmony is that which is right, which fits, which belongs. When establishing a harmonious environment we must preserve the best parts of the existing, remove those items which are conflicting or incongruous, and sometimes introduce appropriate foreign materials to relieve dullness or monotony.



Variety.

F-408223

Harmony.



F-142911

■ **Contrast.**—Contrast is that something which is strikingly different, which holds the eye and creates a definite comparison. Sometimes it appears like a sudden but appropriate exclamation point or shock effect to stimulate the senses. This concept should be used sparingly and with discretion. It can be a most refreshing and long-remembered part of a visitor's experience. Contrast can focus attention upon the best or the acceptable and in so doing, draw attention from the undesirable. However, one must guard against its being overdone and becoming garish or distasteful.

Contrast.



F-478736



F-185211



F-169270



*“We have seen the forests
replanted by the CCC’s,
and watched Gifford Pinchot’s
sustained yield concept
take hold . . .”*

Applying Esthetics to Land Management

Although outdoor beauty is often associated with the spectacular or unusual, it can also exist in the ordinary or commonplace. And if we accept the definition that beauty is “any quality of sense or thought that excites an admiring pleasure,” we can readily include interest and understanding along with pleasing appearance as important components in the appreciation of beauty and in the application of esthetic principles to the natural landscape.

Well-managed forests and rangelands are beautiful to those who view them impartially as well as to those who understand the concepts of land use and the long-range objectives of various management practices. A meadow is beautiful for its contrast, in form and color, with its surroundings, such as a pine forest or a chaparral-covered slope. It becomes more interesting and probably more beautiful when it is also seen as an important part of the watershed, a producer of meat and wool, or a valuable wildlife habitat. Likewise, the unbroken expanse of an ever-green forest can become dynamic, more interesting, and endowed with a particular beauty of its own when it includes well-managed logged areas and vigorous stands of new timber crops that speak of utility and husbandry.

Management of areas especially exposed to the public view, as along roads, must encompass the dual objectives of beauty and productivity to the fullest extent possible. Here the day-to-day operations must include provisions aimed at creating a pleasant site and a favorable impression of forest and range management.

F-465765



A beautiful and productive combination of meadows and timber in high western mountains. These areas produce forage, wildlife, water, and timber.

F-494700



The maintenance of attractive and working forests requires all of the skills available to the forester.

BEAUTY IN WELL-MANAGED FORESTS

The forester's job is much more than the care and growing of trees for the production of wood. His task also includes the management of trees and related vegetation of the forest to protect and improve watersheds, maintain and develop recreation values, and improve wildlife habitat as well as forage conditions for livestock. Practically all lands in the United States need management, and the kind of management depends on the uses to which the land is to be put.

With skill, the forester can employ esthetic principles of variety, harmony, and contrast in his management of the resources. Good management provides an opportunity to create variety and contrast through the arrangement of timber stands of different species and sizes. The principle of harmony is embraced in multiple-use management, which gives appropriate attention to all forest resources and their uses.

E

Regenerating a Forest

For beauty as well as for production, the forester's job starts with the establishment of a new stand of trees adapted to the site. Esthetically, this involves two problems. The first is how to handle unmerchantable material from the previous crop. The second is how to get the new tree crop established promptly and in a manner consistent with other uses. The forester must know how to insure the success of a new crop and how to make the site pleasing to the eye. Following are some of the things he can do in the interest of esthetics when regenerating the forest.

1. Decrepit or broken trees left standing, leaning, or strewn about after a harvest cutting not only offend the eye but they often impede the growth of a healthy new crop. These could best be removed before or during the harvest.

2. The size, distribution, and shape of areas to be reforested should be planned with a view to maintaining the variety and harmony of the scene. Cleared areas should be frequent enough to impart variety, and should be fitted into the topography and local landscape in a way to impart interest and harmony. Wherever possible, boundaries should be made to follow natural breaks in topography or timber types. In addition to scenic variety, breaks in the solid forest provide habitat to attract wildlife, a feature of great appeal

A mosaic of red pine plantations and hardwoods presents a pleasant pattern of contrasts on land once used for other agricultural purposes.

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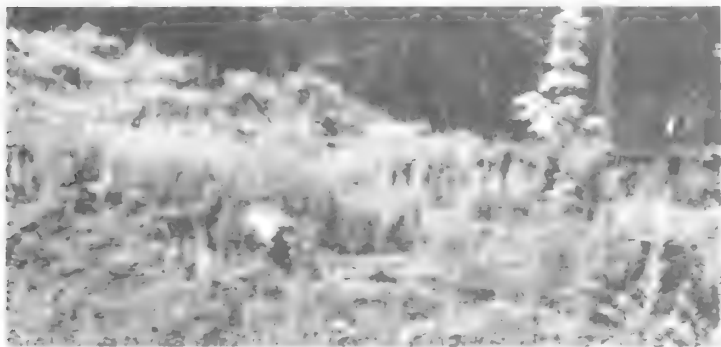
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Careful planning of cutting in overmature Douglas-fir provides not only a new crop of timber but variety in an otherwise unbroken canopy of trees. Most timber types require clear-cutting for the successful establishment of a new forest.

Sometimes the new forest, as in this ponderosa pine stand, is well established before the old forest is removed.

The first few years after logging provide favored habitat for wildlife.



F-487157

to the recreationist and the traveling public. These breaks also provide a place for broad-leaved low vegetation, colorful in both spring and fall.

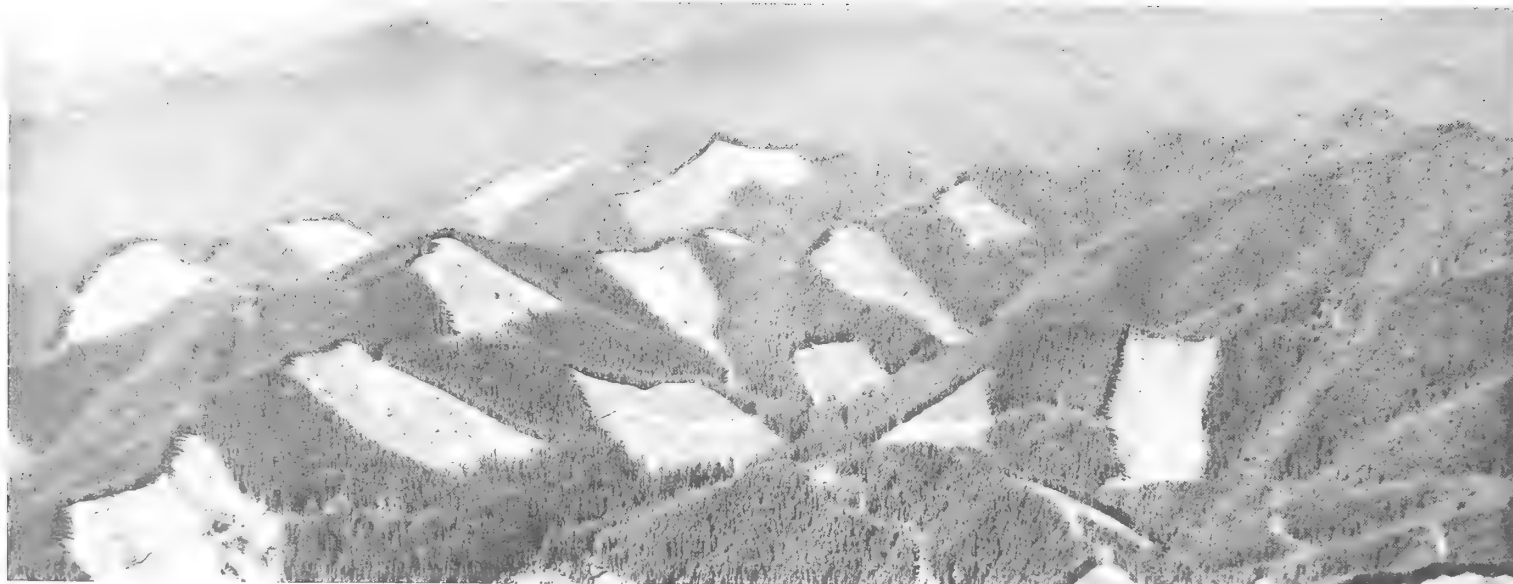
3. Advantage should be taken of the opportunity to start new tree growth under the old, or under a nurse crop where this is possible. For example, in the Sitka spruce-western hemlock forest of the attractive North Pacific coast, it is biologically and economically possible through careful shelterwood cuttings to establish the new growth under the old. This prevents an influx of alder brush and avoids a period of delay until the conifers can grow up through the brush. Foresters are finding more and more situations where the new crop can be established before the old one is removed to give a prompt cover of the exposed area and to maintain the forest

457

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F-560260



A well stirred-up seedbed and a nearby seed source are required for the natural regeneration of Douglas-fir. When these clear-cut patches are covered

with young trees, other patches will be cut. In a few decades the whole landscape will have a new crop of vigorous young timber.

4. Despite the esthetic advantage of getting the new crop under the old, some types of forests can be regenerated only in the open and preferably on a stirred-up seedbed. This is similar to sowing grain on a well-tilled field, and it greatly increases the chances that the area will reproduce promptly to an attractive new forest. Failure to create a stirred-up site may perpetuate a brushfield and indefinitely delay starting a new forest. There is a beauty in the rebirth of an even-aged forest. The openings are only temporary. Signs can be placed to let the public know that a new forest is on its way.

5. Foresters should use the principle of variety by striving to regenerate a mixture of trees in areas of greatest public viewing interest, as along roads. Mixed forests have greater seasonal variations, greater wildlife habitat value, and greater safety from hazards such as fire, climate, and pests, as well as greater attractiveness.

6. Removal of slash—tops and limbs of harvested trees—along travel routes and from public-use areas is usually good fire insurance and always an aid to natural beauty.

Adding Beauty to a New Forest

After the new forest is started, the forester has a number of options in its culture which can contribute to natural beauty.

1. Throughout the life of a forest, there is a fine opportunity to apply esthetic principles by controlling stands through thinnings. Thinnings control the play of light and shadow in the forest along roads. Trees in thinned stands invariably are larger and more stately. Thinnings also can control the development of plants on the forest floor. Where desirable, the density of the stand can be varied to enhance a view or to hide a nuisance. Thinnings can provide sprouts and other browse for wildlife, and increase the production of nuts, acorns, and berries. Birds and animals thus attracted will be more visible to the public.

2. Release operations—freeing desirable trees from competition—are another major esthetic tool. They should be used to favor not only the more valuable trees but other elements in selected locations, such as flowering trees and shrubs, species with beautiful foliage, berries, or special seasonal interest, and species that have particular wildlife or recreational value.

3. Fire carefully applied can also be a tool for maintaining beauty in some forests, as in the longleaf-slash pine forests of the Atlantic Coastal Plain, where a long-unburned forest contains a mass of pine litter draped on heavy brush. Since such fuel carries the grave risk of complete forest destruction by wildfire, controlled burning is a form of forest protection.

4. Judicious pruning can be used for esthetic purposes, particularly along roads, trails, and lakeshores. It allows the eye to see more, and brings light to the lower plant layer of the forest.

Den trees are a valuable forest asset. Here an old maple tree has been left standing to provide a home for the raccoon.

F-501488



All-aged forests generally contain mixtures of tree species, and are especially attractive in fall coloration. Only the largest and oldest trees are harvested from these stands.



F-401469

Variety With All-Aged Forests

Many important forest types contain trees of several ages, including such attractive mixtures as the maple-beech-hemlock forests of New England, the hemlock-redcedar forests of the western mountains, and the spruce-fir-paper birch forests of the Lake States. The all-aged forests are attractive because they contain a variety of patterns, textures, and tree sizes. Those containing hardwoods generally have lovely fall coloration.

Timber harvesting in all-aged forests removes the larger and older trees, at the same time providing more room for younger and smaller trees to grow. A forest cover always remains on the landscape, and the signs of logging are hidden or soon disappear.

All-aged management tends to increase the proportion of those components in the mixture which are least valuable commercially, for example, sugar maple and balsam fir in the eastern forest types. The problem of retaining desired components can sometimes be solved by clear cutting in small patches or strips. This practice is really even-aged management in small areas, and like all-aged management, modifies the landscape only slightly.



F-447720

One million board feet of timber was harvested 3 years before the picture was taken of this forest in western North Carolina. A vigorous stand of young hardwoods remains to clothe the mountainside.

In high-value recreation areas mature trees are sometimes harvested in small patches to cause the least disturbance to the forest cover. When trees fill the openings, other patches are cut.

F-499287







F-501117

BEAUTY ON THE RANGE

Rangelands with their herds of cattle and sheep, cowboys and sheepherders, and wildlife such as deer, antelope, and coyotes are an exciting part of our American heritage. Almost every schoolboy is familiar with the role of ranching in the development of our country and has been thrilled by the stories and legendary characters associated with the open range and the livestock industry of the West.

Ranges can be better appreciated if we know more about their values and management. The vast public and private rangelands of our country not only provide seasonal forage for more than 50 million cattle and sheep, but also provide habitat for some 10 million big-game animals as well as countless numbers of small mammals, birds, and other species of wildlife. Rangelands are important watersheds from which come a substantial portion of the Nation's water supply.



They also provide a wide variety of recreation opportunities.

Well-managed ranges with vigorous stands of vegetation present to the traveling viewer a constantly changing panorama. They may be a patchwork of contrasting plant communities, often with well-defined borders that indicate abrupt changes in one or many factors of the site—soil, slope, exposure, moisture, or temperature. Or they may be single communities which change in appearance from season to season or even from day to night.

Domestic animals are an essential part of the range community. A rangeland view is improved when it includes livestock in good condition, vigorous vegetation, and stable soils. Enjoyment of the beauty of such a pastoral scene is increased by the satisfaction of recognizing a good job of land and livestock husbandry.



F-495394

Rangeland: Integrated Plant and Animal Communities

Wild animals, too, are a source of interest and beauty. To some people the ultimate in outdoors enjoyment is viewing a deer or elk in its native habitat, or a coyote slinking across an opening in the chaparral. To others it is the sight of a gracefully soaring hawk or the song of an unseen bird. Enjoyment of wildlife, however, is heightened if it is recognized as an intrinsic part of a landscape where all living creatures are part of the biotic community. Knowledge of this community's operations—interaction, competition, and dependence among its many plant and animal components—leads to keener appreciation and consequently to fuller enjoyment.

Wise use of the range allows for the production and periodic harvesting of livestock and game. Since cattle and sheep compete directly with elk and deer, as well as with the smaller herbivores, range managers must control the number of animals to assure sufficient forage for both livestock and wildlife without undue damage to range vegetation and soil.



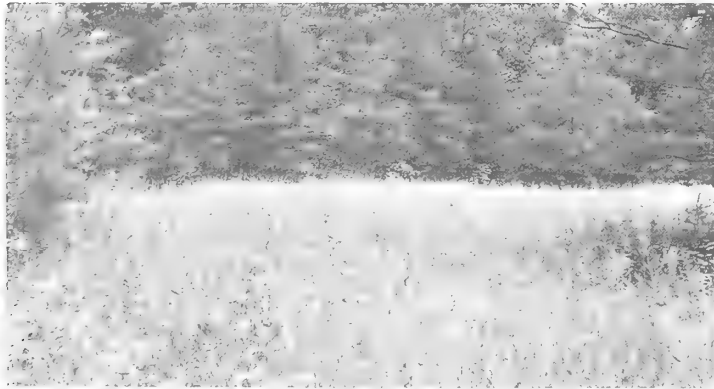
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F-568010



F-437891



F-495418

Improving the Vegetation

A range with deteriorating vegetation and eroding soil presents an ugly picture, objectionable from both the esthetic and resource-management standpoints. Reestablishing desirable herbs and shrubs not only adds beauty, but also improves the livestock range and wildlife habitat.

Sometimes the deteriorated range can be made more productive as well as pleasing to the sight by changing the existing vegetation. This may involve the control of certain undesirable species or the complete conversion of trees or brush to herbaceous vegetation. Large areas are often treated to improve their capacity for supporting livestock or wildlife and, in some instances, for improving water quality and yield. Since chemicals, fire, and heavy equipment are used to destroy the existing vegetation, the appearance of the landscape is often severely though temporarily altered. However, viewers are better able to accept such disturbances if they understand that what seems to be drastic treatment is just one of a series of steps to achieve greatly desired objectives. These scars are rapidly covered by new and more desirable vegetation.

Grassland adjacent to forest or brush cover is the preferred habitat of many wild animals. A common practice is to clear relatively small openings in timber stands or brush fields, and establish good forage in such openings. Wildlife habitat is thus greatly improved and often results in larger numbers of such species as elk, deer, and turkey. Openings also provide pleasing variations in unbroken expanses of vegetation as well as better opportunities to observe the wildlife. Special consideration should be given to such openings when planning roadside rest areas and vista points.

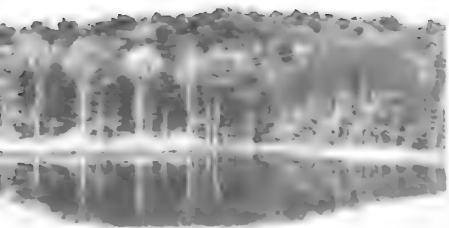


FIG. 12-15

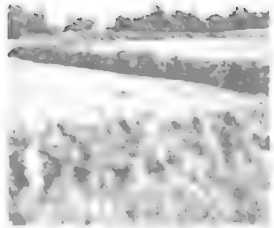


FIG. 12-16



FIG. 12-17

Harmony in Range Structures

Just as the livestock and vegetation are a vital part of the range scene, fences, corrals, and water developments can add to interest and beauty if they are made to blend in with the landscape. Appearance, as well as utility, is an important factor in the design of range structures. A white-washed board fence is a suitable structure for an improved pasture in Kentucky and Virginia; a log or pole fence is more appropriate for separating two livestock allotments on a western National Forest. In other places, hedges of shrubs or vines may serve as fences while they also provide wildlife food and cover, and form attractive additions to the landscape. Windmills, troughs, or ponds and even commonplace corrals can be designed to harmonize with the landscape.

Beauty and utility under management.



FIG. 12-18



*“We must not only protect the
countryside and save
it from destruction,
we must restore
what has been destroyed . . .”*

Planting for that Touch of Beauty

America is blessed with a great number of plants that can be used to make our surroundings more pleasing. Outdoor beauty can be accented or created by planting trees, shrubs, and other plants that have showy flowers, colorful leaves or berries, or distinctive forms. When used in combinations, they often produce telling effects as, for instance, in placing flowering shrubs against taller background trees, or varying the composition of a screen to provide spring flowers and fall colors. Freshly graded or bare slopes along roads and trails are protected and their appearance improved when grasses, wildflowers, or vines are sown. Not only do plantings add a touch of beauty to a place but they attract songbirds and other wildlife.



TREES FOR BEAUTY AND COVER

The dogwoods. The flowering dogwood of the East and the Pacific dogwood of the West are two of our most beautiful trees. The attractive white "flowers" appear before the leaves in the eastern dogwood, but after the leaves in the Pacific dogwood.

The eastern dogwood grows from northern Maine and Michigan south to north central Florida and west to eastern Texas and eastern Kansas. It grows better on light soils than on heavy soils and seldom occurs on poorly drained soils. Litter from dogwood is rich in minerals, beneficial to trees and other plants.

Dogwood grows up to 40 feet tall and 12 inches in diameter. It grows rapidly for 20 to 30 years but very slowly thereafter. Dogwood is easily injured by fire and is susceptible to drought. After injury or cutting, the tree sprouts vigorously.

The Pacific dogwood has a much smaller range, growing along the Pacific coast from southern British Columbia to central California. It grows to larger sizes than the flowering dogwood.

Plant dogwoods not only for their flowers but also for their orange-red berries and red fall coloring.

Southern magnolia. This evergreen broad-leaved tree grows from North Carolina along the Atlantic coast and gulf coast to southeastern Texas. It seldom is found at elevations of more than a few hundred feet. It has, however, been planted successfully as far north as Massachusetts on the Atlantic coast and as far as British Columbia on the Pacific coast. Although it is native usually to bottom-land or even mucky soils, it has been planted successfully on well-drained upland soils.

Mature southern magnolias may grow to 5 feet in diameter and 100 feet in height. More commonly they are 60 to 80 feet tall and 2 to 3 feet in diameter. These trees have few serious enemies, except fire.

Plant southern magnolia to accent its large white flowers and glossy evergreen foliage.



F-276870



F-490871

Redbud. This small tree grows throughout the East, from Pennsylvania at its northern limit, to Florida and eastern Texas. Although it grows as a bush on the mountain ranges and in bottom lands, it is generally a tree on the rocky hill-sides. On the highest mountains of the West, the tall, thin one often is only 15 to 20 feet.

Plant this tree to show off its pink or orange-red flowers, which appear in the first half of the spring. Often this tree flowers at the same time as the weeping birch, but is usually earlier.

Paper birch. Paper birch is native to the north or part of the United States and to Mexico, Wisconsin. It is a large tree and patches as far as the North Carolina and Canada, and it is grown in the States of Virginia, North Carolina, and Florida. It grows well on a variety of soils.

Paper birch is a tree 10 to 15 feet high, growing to 20 inches in diameter. It has a trunk that is smooth and white at first, but is grayish-brown when the bark is old. The bark is thin and peels off in small pieces, and the inner bark is a rich, reddish-brown. Young trees are especially easily damaged by fire.

Plant this tree to show off its early flowering and its white bark, if its paper-bark is desired.

Red maple. Red maple grows throughout the East, from the Atlantic Ocean to the Pacific States and into Canada, to Florida. It is found on all kinds of soil, but it is common to wet soil. The tree reaches a height of 12 feet and a diameter of 5 feet. It grows rapidly when young and its roots are hard to dig. Ice storms and strong winds can cause serious damage to its brittle branches.

This maple is one of the first trees to flower in the spring. The clusters of small red flowers appear before the leaves, in February in the South and as late as May in the North.

Plant red maple to show off its early flowering and orange-red fall colors.

Paper birch.

1-211-77





F-498556

Eastern white pine. This valuable pine grows from Nova Scotia to Minnesota, south to northern Iowa and Indiana, and through the Appalachian Mountains to northern Georgia. Although it grows on nearly all kinds of soils within its range, the best stands are found on sandy, well-drained soils which are too poor for fast-growing hardwoods.

White pines attained diameters of about 12 feet and heights over 200 feet in the original forests, but trees up to 150 feet and 40 inches in diameter were more common. On good sites it often grows in height as much as three feet per year when young. This pine has two serious enemies—the white pine weevil and the white pine blister rust—but precautionary measures can prevent much damage.

White pine is one of the most beautiful conifers and should be used often as a background or screen tree. Its silvery green foliage, black trunk, and interesting branching habit make it especially pleasing.



Eastern hemlock. This tree grows in the Northern States from Maine to Minnesota and south through the Appalachian Mountains to northern Georgia and Alabama. It is typically a cool climate tree but it will grow under warmer conditions. It usually grows on acid soils and will tolerate a boggy site.

Eastern hemlock becomes a very large tree at maturity on favorable sites, up to 7 feet in diameter and 160 feet tall. It grows rapidly when planted in the open but has the ability to grow well under the shade of hardwoods. Aside from fire, this tree has few serious enemies.

Plant this tree in cool climates or in shade as a screen or background because of its feathery, drooping branches and thick foliage,

Western hemlock, a tree similar in appearance and habitat, grows along the Pacific coast south in northern California, and east in northern Idaho and western Montana.

Western redcedar.



F-309008



F-482454

Western hemlock.

Western redcedar. This cedar is found in the Pacific Northwest as far south as northern California and as far east as western Montana. It is typically a tree of cool moist climates, often found on wet soils high in organic matter. But it does grow on dry, sandy sites as well, although slowly.

Western redcedar grows to enormous sizes, as large as 200 feet tall and 16 feet in diameter. It is only average in its growth rate, even when planted in the open. It will grow in shade and is classed among the most tolerant of western trees. It has few serious enemies, except for fires, which easily burn through its thin bark.

Plant this tree as a screen or background tree, featuring its cascading foliage which often droops to the ground.

Pacific madrone. Ranging from southern California to British Columbia in western Washington, Oregon, and California, Pacific madrone is one of the most widely occurring broad-leaved trees in the West. It can grow on quite dry rocky sites in its range and is drought resistant.

Pacific madrone reaches a height of 80 feet when mature. Rather slow in growth, it is ordinarily not found under the shade of other trees except in open stands. It sprouts vigorously.

Plant this tree on dry sites to accentuate its evergreen, glossy leaves, its smooth bark, and its clusters of reddish berries.

ALWAYS A PLACE FOR SHRUBS

Wild roses. Found in every State except Hawaii, wild roses are ornamental for the large fragrant flowers with five spreading pink petals, the seeds in reddish hips, and the shiny foliage.

Plant in borders of roads and woods, as hedges or barriers, and for thickets of wildlife cover and food.

Mountain-laurel. This is one of the most beautiful hardy broad-leaved evergreen large shrubs in the Eastern States. The light pink saucerlike flowers are borne profusely in clusters.

Use for foundation planting in wooded areas and on highway slopes in acid soils.

Rhododendrons. These hardy evergreens with large leathery dark green leaves and big bell-shaped flowers varying from white to pink or purple are native mostly in the eastern mountains. One of the most beautiful is the purple-flowered Catawba rhododendron of the southern Alleghenies.

Plant in groups as evergreen background in partial shade on acid soils.

Azaleas. These small deciduous shrubs have clustered funnel-shaped flowers that are usually pink, white, or purple, and less frequently yellow or red. Several species are native in the East and on the Pacific coast. Flame azalea with brilliantly flame-colored flowers is regarded by many as our most beautiful native shrub.

Plant in acid soil for colorful display.

Hollies. Small red berries and evergreen leaves identify these attractive ornamentals of the Eastern States. Inkberry or gallberry of the Southeast has black berries. Others, such as common winterberry and possumhaw, shed their leaves.

Plant for Christmas decorations, shelter for wildlife, and food for birds. Both male and female plants are needed to set fruit.

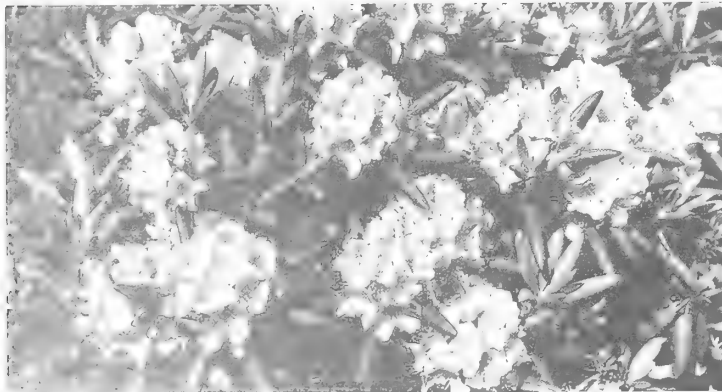
Sumacs. These shrubs, widely distributed across the country in openings and thickets, are noted for their scarlet or orange autumn foliage and the clusters of many small, reddish fruits. Smooth sumac

Mountain laurel.



F-471121

Rhododendron.



F-443191

with pinnate leaves is found in all States except Alaska and Hawaii, staghorn sumac in the Northeast, and shining sumac or flameleaf sumac in the East. Fragrant sumac in the East and skunkbush or scrubshrub in the West have three leaflets, while a few southwestern species have leathery evergreen leaves.

Plant for masses along roads, walls, banks, and in front of taller plants or dry slopes with erosion control and windbreaks.

Wild cherries. Including chokecherries, they grow in all States except Alaska and Hawaii and are among our most important wildlife food plants. They produce clusters of many small five-petaled white flowers and small roundish or oval berries. The related wild plum is generally eastern.

Plant for wildlife cover, erosion control, and windbreaks.

Elders or elderberries. These large shrubs with coarse foliage and numerous small five-lobed white flowers occur throughout continental United States including Alaska especially in moist soil along streams.

Plant for the black, blue, red, or white berries which are relished by birds and prized for jellies and dries.

Viburnums. These popular ornamentals, native mainly in the East, have clusters of many five-lobed white flowers, mostly blue-black edible berries, attractive paired leaves turning reddish in autumn, and compact regular form. They grow best in moist sunny places. American cranberrybush, with three-lobed leaves and bright scarlet edible fruits like cranberries, is one of the Northeast's most ornamental shrubs.

Plant for decoration and wildlife cover and food.

Hawthorns. These thorny shrubs or small trees are common in the East, especially in clearings and pastures, and are scattered in western mountains. They have flowers with five spreading white petals, small reddish fruits like apples, and dense rounded crowns much used for bird nests.

Plant for wildlife cover and food, screening, hedges, and ornament.



Hawthorn



Azalea

Mountain-ashes. Many small white flowers in spring and red berries, persistent in winter, characterize these shrubs and trees of the North including Alaska and mountains southward.

Plant for ornament and wildlife cover and food. In the East, insect borers may be destructive.

Oregon-grape. This and related western species of mahonia, hollygrape, or barberry, are hollylike evergreens with leathery glossy, spiny-margined leaflets, golden-yellow flower clusters, and blue-black berries.

Use for foundation plantings and ground covers.

Mockoranges. Several species in the Southeast and West, known also as philadelphus and syringa, have many large fragrant flowers with four or five white petals.

Plant as compact ornamental shrubs and screens.

Yucca.



Bitterbrush. A member of the rose family, this gray-green shrub with yellow flowers is widely distributed throughout the West. It is long-lived, exceptionally drought resistant, and thrives under rigorous conditions.

Plant for ornament, food for wildlife and livestock, and ground cover.

Yucca. Several species with sharp-pointed daggerlike leaves and clusters of large white flowers are found in the Southwest and Southeast.

Plant for ornament and erosion control.

CLIMBERS AND CLINGERS

Wild grapes. These high-climbing vines are widely distributed in moist sunny areas but absent in parts of the West. The small dark blue grapes are prized by birds and fur bearers, while the foliage is often shiny and turns red or purple in autumn. Plant for fast-growing screens of dense foliage, erosion control, and for wildlife food.

Virginia creeper. A grapelike eastern clinging vine that usually has five-toothed leaflets which turn brilliant scarlet, and small blue-black berries. A relative of wild grapes, it has similar uses.

American or climbing bittersweet. This hardy eastern twining vine is attractive in autumn for the clustered yellow seed capsules, red seeds, and yellow foliage. Male and female flowers usually are on different plants.

Common trumpet-creeper or trumpetvine. A handsome clinging southeastern vine that bears clusters of large orange to scarlet trumpet-shaped flowers. It is common and often a weed in moist areas. Use for large-scale plantings.

Yellow or Carolina jessamine. A handsome twining southeastern vine with paired narrow evergreen leaves and golden masses of trumpetlike fragrant flowers in spring. Plant for vines and ground cover on banks and roadsides in the Southeast.

Blackberries. The prickly, partly climbing stems form thickets of wildlife cover in moist open places across the continent. The blackberries are important food for wildlife and man, while the large five-petaled white flowers are showy.

Crown vetch.



F-194738



Sericea lespedeza.

F-154818

FLOWERS AND A BLANKET OF GREEN

Forbs

Forbs (herbs that are not grasses or grasslike) are noted for the attractive flowers that complement the beauty of other vegetation. At the same time they protect the soil from erosion and provide food and cover for wildlife. Forbs belonging to the legume family are particularly desirable because, in conjunction with bacteria that fix nitrogen from the air, they greatly improve soil fertility. The following are a few of the more desirable forbs that help beautify a landscape:

Crown vetch. One of the most attractive and useful legumes, this species has been long naturalized in the Northeastern States. It is an herbaceous perennial with strong rootstocks, creeping stems, and a reclining habit. It has pinnate leaves and spherical heads of pink flowers.

Sericea lespedeza. This is another well-naturalized legume that has been found to be one of the most valuable erosion-control plants in the stabilization of highway embankments in the Southeastern States. The flowers are greenish yellow; the mass effect of the leafy stems is very pleasing. This perennial is about 3 feet high, with deep roots and trifoliolate, cloverlike leaves. In addition to its value in

erosion control, its seeds and foliage furnish food for birds and rabbits, and the plants form good nesting cover for bobwhite and other birds.

Lupines. The lupines, another group of legumes, are much better developed in the West where they are frequently a colorful feature in the landscape. Here the individual sweetpea-like flowers are arranged in cylindrical spikes that rise above the rich green foliage. Some are low annual species that blanket desertlands with brilliant hues of blue and pink in early spring. Others are large perennials, sometimes even shrubs, that are found usually in colonies at all elevations, extending up to timberline or higher in the mountains.

Colorful wildflowers. These add interest and beauty to the predominantly green background by their great diversity in color and seasonal variation. Such colorful natives (or, in a few instances, long-naturalized exotics) as goldenrod, red clover, Indian paintbrush, California poppy, arrowleaf balsamroot, beargrass, black-eyed susan, daisy, violets, asters, monkey flowers, wild phlox, milk vetch, beard-tongue, and partridge pea are among the numerous possibilities for roadside planting.

Goldenrod. This group which contains 75 species in the Northeast alone is well known in some of its forms to almost everyone. Growing in extensive colonies, as it so often does, it brightens fields and roadsides with its brilliant yellow panicles of minute flowers from midsummer to late fall. Many of the most common species are adapted to sterile soils, which makes them particularly useful for poor soils on highway slopes and shoulders.

Asters. The wild asters also contribute vivid color to meadows and roadsides from midsummer through fall. There are hundreds of species; they range in color from deep purple through blue and lavender to white. Some of the white-flowered species with small heads of flowers often cover acres of abandoned, sterile fields, but many others with showy, pyramidal panicles of large purple or blue flower heads form attractive groups 1½ to 5 feet high along our highways. Other species, like the large-leaved aster, are lower plants with fewer heads of lilac-colored flowers and attractive foliage, the leaves being large and heart shaped. This group grows best at the edges of woods where they receive at least partial shade.

Beargrass.

F-499446



F-169725



F-375585



Smooth hoods phlox.

Arrowleaf balsamroot.

Monkey flowers. These are more plentiful in the West—over 100 species in the Pacific States than in the rest of the country. The plants are usually four-petaled and bright in color, with large, bright flowers. They come in several colors, yellow, orange, spotted with red, sh. blue, and so forth, and are very hardy. Several species are popular as the lawn or border plants. Other species that form carpets of grass-like plants are also used. Others are used in park walks and in flower beds. They are found in low, open, one of them is a good ground cover for the slopes of the Northwest, where it is found in stream banks, wet fields, along rail cuttings, and wet roadside ditches.

Grasses

Grasses that only grow in certain areas are not groups of plants used for lawn purposes. They are used for lawns in the region where they grow as a sort of lawn grass, and are used in lawns. Mixtures of several kinds of grasses are commonly used for lawns, so that the hardier, winter grasses will grow better in the winter, and a permanent green lawn will be maintained in the summer. The quantity needed for grasses that are used for lawns is not so large as for a lawn, and they are not so hardy as the grasses that grow in

poor soils, resistance to weed invasion, and deep roots for stabilizing steep slopes. If allowed to grow to maturity, a few species produce striking plumes and are highly valued as ornamentals. Following are some of the more important perennial grasses.

Bluegrasses. These grasses are widely distributed throughout the United States, particularly in the northern and western sections. Kentucky bluegrass, one of the most useful species, will grow on a wide variety of sites but thrives best on well-drained loams. It forms a good sod and will withstand trampling and close cropping or mowing. If the moisture supply is ample, its foliage will remain green throughout the summer. Canada bluegrass, another important member of this group, is better adapted to the poorer and drier sites. It will tolerate clay, sand, or gravelly soils but does not form as dense sod as Kentucky bluegrass.

Fescues. Most of the fescues are bunchgrasses; consequently, they are often mixed with sodformers to provide a more complete soil cover. Red fescue is particularly good for seeding with Kentucky bluegrass on the better sites. Tall fescue is better adapted to less fertile soils and is one of the more luxuriant and attractive grasses now being used extensively along highway slopes. Chewings fescue is a sodformer that is suitable for light soils on dry sites.

Grass the healer



F-11722

Silvergrass



F-51077

Wheatgrasses. This group, containing both bunchgrasses and sodformers, is adapted to the drier sites of the West. It includes native species such as bluebunch, western, and slender wheatgrasses, as well as introduced species such as crested, intermediate, and tall wheatgrasses, widely used for seeding depleted rangelands. These large-seeded species are particularly easy to establish and are remarkably free from disease.

Other grasses for cover. Redtop, ryegrasses, lovegrasses, orchardgrass, and smooth brome are useful perennial grasses adapted to a wide variety of conditions. They not only provide nutritious forage for wildlife and livestock but also make a tough ground cover, tolerant to mowing, grazing, or trampling. Bermuda and Bahia are warm-season grasses especially well adapted to the South. They spread by runners and form dense sods that are good for roadside turf and for controlling erosion.

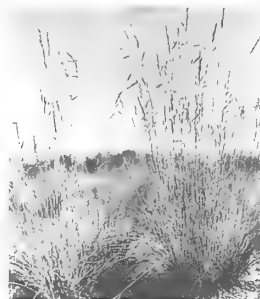
Ornamental grasses. Although grasses are most commonly used to provide an attractive roadside cover, a few species are best known for their beautiful seed heads. Among these, Natalgrass with its striking panicles of silky, pink spikelets is a noteworthy species for the South, as is also sea oats with its graceful, drooping panicles of large, extraordinarily flattened spikelets. An ornamental species of the West, well adapted to roadsides, is Indian ricegrass, which grows in graceful, spreading clumps 1 to 2 feet tall. Its feathery silver-white spikelets borne on hairlike stalks are a striking feature along arid embankments from Manitoba to California. Another chiefly west-

ern grass, sideoats grama, occurring on plains and rocky hills, is notable for its pendent, purplish spikelets arranged along one side of the stem, suggestive of a necklace.

For occasional beauty accents on sites that do not require mowing, such spectacular grasses as pampasgrass and silvergrass may be used. The reputation of pampasgrass for decorative purposes is so well established that in southern California it is grown commercially for its plumes. The arching stalks are grouped in bamboolike clusters, frequently reaching a height of 20 feet, and the silvery white to pink plumes may themselves be 3 feet long, resembling gigantic feather-dusters. Silvergrass or eulalia, another robust species, is uniquely attractive for its silvery plumes, which are tossed about by the slightest breeze.

Bunchgrass.

F-421132



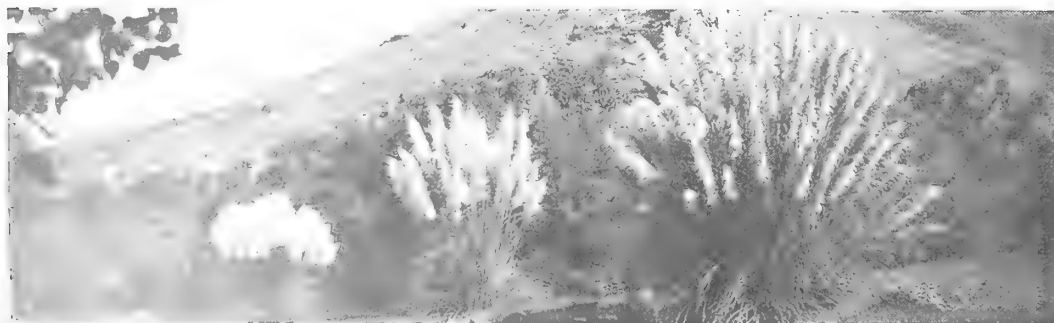
Crested wheatgrass.

F-437889



Pampasgrass.

F-390529



GETTING READY TO PLANT

The American landscape often needs beautification because construction activities, fires, storms, and other disturbances have damaged or destroyed the vegetation. If vegetation is to be reestablished on these sites, extra effort is usually required to make plantings successful. Site preparation provides a more favorable environment for the establishment of trees, shrubs, and grasses, and improves chances for their survival. In all cases, a clean, firm planting bed with good water relations between plants and soil should be provided.

Site Factors—Soil, Climate, Vegetation

A most important consideration in preparing sites for vegetation is the soil itself, its physical characteristics which affect soil-water and soil-plant relationships, its fertility, and its tendency to erode or become unstable. It is often necessary to reduce compacted soil conditions which would adversely affect infiltration of water, the water-holding capacity, and availability of soil moisture to the plants.

Another influential factor is climate. Rainfall is the key because there must be sufficient moisture for plant growth. Some sites are so severe because of exposure and high temperatures that moisture evaporates or runs off before it can be efficiently utilized. For these, supplementary irrigation will be necessary. Also, root systems of newly established plants are short and water must be kept available to them if the plants are to survive.

In site preparation it is also important to eliminate worthless, undesirable vegetation that impedes the establishment of attractive plantings in the competition for space, water, and soil nutrients.

In preparation for seeding to grass and planting to streamside trees and shrubs, this eroding streambank has been graded with tractor and dozer. Next steps will be to plant the vegetation and tie down the slopes until a vegetative cover is established.



Improving Sites and Stabilizing Soils

Soil conditions can be improved and undesirable competing vegetation eliminated in the same operations. On reasonably flat or level sites, an ordinary farm tractor with attachments can be used to cultivate the soil, break up the compacted layers, improve the infiltration of water, and eliminate existing small vegetation. Where a site is badly eroded, heavy machinery may be needed to fill in gullies, improve the shape of the landscape, and divert the surface flow of water. Before a permanent vegetative cover is planted on soils completely lacking in organic matter, a crop of coarse vegetation such as sweet-clover might be grown and plowed into the soil to improve its structure and ability to absorb and hold water.

If overland flow is coming onto a planting site from above, ditches can be dug which will divert that flow away from the site. On the site itself, surface flow can be reduced and controlled by small terraces, contour ditches, or "wattling" with live barley plants or small shrubs at 2- to 3-foot intervals on the contour.

Mulches are useful in protecting potential planting sites from erosion and freezing, and from rapid loss of soil moisture. Cuts and fills of newly constructed roads are often treated with an air-blown mixture of straw, asphalt or latex, and seed. This mixture dries into a firm but porous layer over the entire surface of the planting site. Fiberglass matting and paper and jute nettings are also used.

Eliminating Competing Vegetation

Cultivation is one of the most effective means of eliminating undesirable vegetation. To eradicate some species, burning or spraying with appropriate herbicides may be necessary.

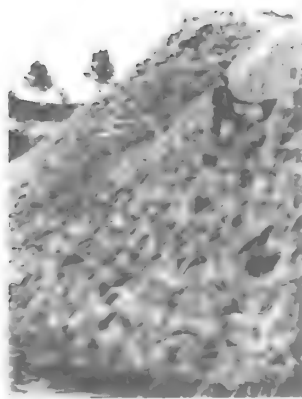
Fire and herbicides should be used with utmost care. Fire is difficult to control and some plant species sprout prolifically after burning. Herbicides must be confined to the specified area being treated. Information on the response of plant species to fire and herbicides, and laws governing their use should be obtained locally.



Completion of a streambank stabilization job with mulch and poles in place to stabilize the bank until vegetation covers the site.

F-486411

A living mulch of weeping lovegrass is used in badly eroded areas of the South to give stability until young planted pine trees become large enough to occupy the site and deposit a protecting layer of pine needles.



F-104106

Improving Soil Fertility and Correcting Toxic Conditions

Correcting soil or toxicity problems often requires laboratory analysis of soil samples. This will determine which nutrients are deficient and how much of each must be applied to meet minimum requirements for plant growth. If a cover of herbaceous vegetation is to be established, fertilizer can be broadcast at the time of seeding, but not until the major site preparation has been completed. Green manure crops, barnyard manure, or other organic fertilizers should be worked into the soil during site preparation. With trees and shrubs, organic fertilizers can be placed in the planting holes, but mineral fertilizers must be placed at a depth below the initial root area to avoid direct contact and damage to the root system.

Where soils contain strong toxic elements such as alkali salts, acids, and certain mineral compounds derived from aluminum, iron, manganese, etc., the toxicity must be corrected before attempting to establish vegetation. For acid soils, heavy applications of lime or other basic compounds are required. Alkali salts can best be reduced by installing subsurface drains and applying heavy amounts of water to leach the salt through the soil. Other toxic elements also require special treatments.

Steep fill slopes on roads require special care to assure their stability. This slope has been trenched or furrowed on the contour, a mulch of straw applied immediately after seeding to grass, and then covered with a netting of heavy jute, held in place by wooden stakes.



F-503755

PLANTING TIPS

Plans for tree and shrub planting should be made well in advance of the planting season. Plans should include species, size of stock, number needed, their location on the land, estimated costs, and labor and equipment required. Get the help of people with professional and technical skills when preparing a plan for planting. This help can often make the difference between success and failure.

Time to Plant

Fall and spring are generally the best times for planting except in the warmer climates where winter months are favorable. Check planting seasons with local authorities. Plant only dormant stock and don't attempt to plant during periods of unfavorable weather.

Obtaining Planting Stock

Reputable nurseries are usually the best source of planting stock. Obtain only hardy stock that has proved suitable for your local areas. Transplanting native wild stock is not recommended unless it is done by an expert. Order the stock well in advance of the planting season. Arrange for a delivery date that will meet your planting schedule. Keep in mind that young trees and shrubs usually recover sooner from the effects of transplanting and make more vigorous new growth than older and larger stock.

Care of Planting Stock

In advance of receiving the stock, the location of the plants should be staked and the holes dug. Plant stock as soon as possible after it is delivered. Protect the roots from exposure to drying winds or sunlight before and during planting. Keep plants in a shaded and cool location. If a delay of more than a few days in planting becomes necessary, the stock should be placed in appropriate storage or heeled-in at the planting site. Handle balled stock by lifting the ball; carrying it by the main stem often damages the small roots inside the ball of earth.

Spacing of Planting Stock

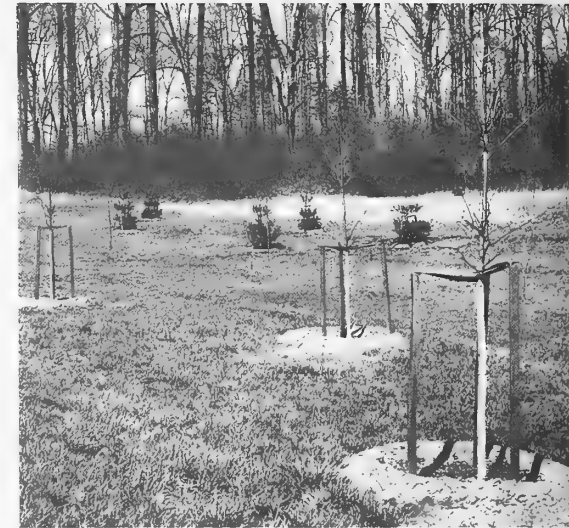
Specimen plants should be given ample space for full development, unless they will be thinned as they develop. Large trees that grow

A combination planting of evergreen and deciduous trees interspersed with shrubs adds beauty to the landscape.

F-510923



Shrubs interplanted with trees bring pleasing relief in attractive sodded areas.



F-510927

Careful planning and technical know-how achieved this attractive blend of pine and spruce trees in a native hardwood landscape.



F-510924



An important element of planting is setting the tree properly in the soil.



Fertile topsoil around the ball of roots aids early growth and survival.



Care and thoroughness mark the professional tree-planter.

to a height of 75 to 100 feet or more should be placed at least 40 feet apart. Medium sized species that grow to a height of 50 to 75 feet can be spaced 30 to 40 feet apart. Smaller trees should be spaced at intervals of 20 to 30 feet. Most shrubs and understory (below tree height) species do best when planted at a spacing of 5 to 15 feet depending upon their size and shape when mature. It is usually advisable to interplant shrubs with the trees. Select shrubs and understory species that are compatible with the tree species. If a grouping, clump, or screen appearance is desired, the spacing must be adjusted to obtain the desired effect.

Pruning Before Planting

Usually the nurseryman will do all the pruning necessary before delivering the planting stock. Damaged roots or branches should be pruned with a sharp knife, saw, or pruning shears. Always prune some of the branches at a time when part of the root system is removed. This will compensate for loss of roots and increase the prospects of survival and early growth. Here again the aid of professional or practical experience should be sought.

Planting Techniques

Success in transplanting trees and shrubs depends largely on the soil preparation and the planting techniques used. Dig a hole twice the size of the ball of earth holding the roots, or of the root system on bare-rooted stock. Separate the topsoil from the subsoil when digging the hole. Be sure the soil around the hole is loosened. Ordinarily it is advisable to set the plant at the depth it grew in the nursery or not more than 2 inches deeper. Do not remove the burlap, but you may cut the string holding it. First, use the topsoil to fill the space around the roots, then compact it to eliminate air pockets. If necessary fill the top part of the hole with the subsoil. With the topsoil in the bottom of the hole, the roots will come in contact with this fertile soil and begin growth quickly. For seedling stock it is not usually necessary to dig a hole. The roots can be placed in a slit and the soil firmed around them.

Seeding Grasses and Forbs

The methods of seeding grasses and forbs depend on the site and the kinds of vegetation to be established. Seeding steep roadside cuts and fills, for example, may require the use of a hydro-type seeder-fertilizer-mulcher, whereas plowing and drilling may be all that is required on other sites.

Although many seeding methods can be used, applying a few tested principles will assure good results. It is usually necessary to remove undesirable competing vegetation. Then seedbeds are improved as necessary by plowing, disking, or other means. Seeding is done when enough moisture can be expected for seed germination and seedling growth. The seed must be covered with soil, ordinarily at depths less than 1 inch so as to allow emergence of shoots. Drilling accomplishes this best. If seed is broadcast, it must be covered adequately by some special treatment. In general, grass can be seeded at 2 to 12 pounds per acre. The type of seedbed and efficiency of planting methods, purity and viability of seed, size of seed, growth characteristics, and productive capacity of the site all influence the proper amount of seed to sow.

Some species of grass, such as Bermuda and St. Augustine, can be started more effectively and rapidly by planting sprigs from established sod. The best planting time for sprigs is from early to mid-spring. To insure a rapid coverage of bare areas, spacing should be no more than 12 by 12 inches. If possible, sprigs should be obtained from sod growing on a sandy rather than clay soil; handling and planting them is easier because they are readily separated.

F-502116



Trees can bring beauty and profitable production to much land now idle.



The President plants a tree.

COURTESY OF AMERICAN FORESTRY ASSOCIATION

PLANTING TO SCREEN AND PROTECT

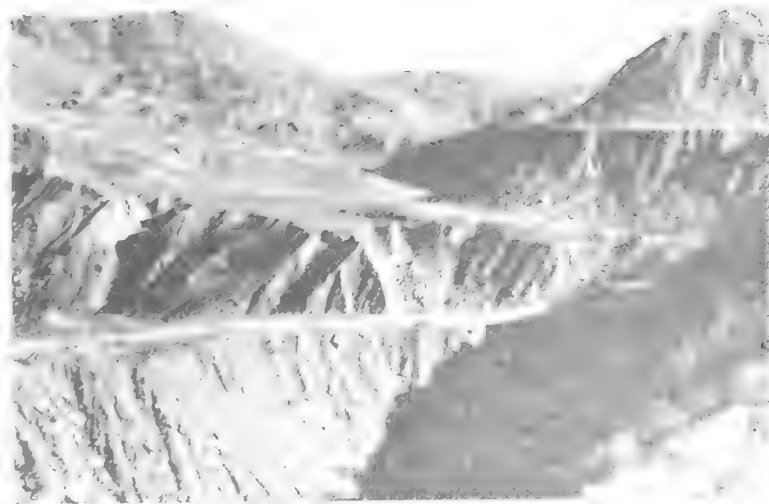
Screening and protection of water bodies is a critical component of water quality management. The following text discusses the importance of planting vegetation to screen and protect water bodies from erosion and sedimentation. It highlights the benefits of using native plants and trees, and provides information on how to select and plant these species. The text also discusses the importance of maintaining the vegetation and the role of the community in protecting water resources.

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PLANTING TO SCREEN AND PROTECT

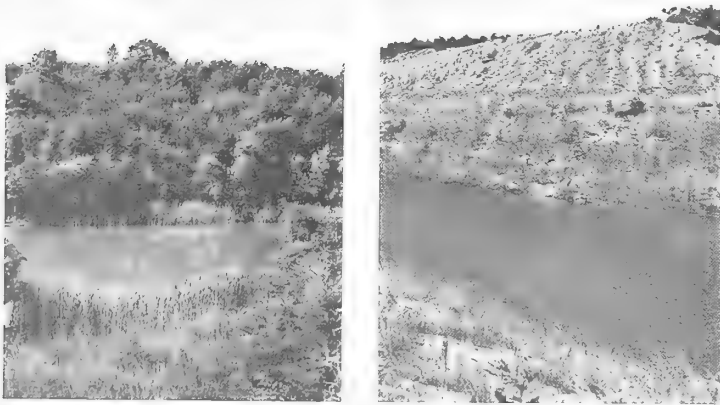
SUS. NR. 1. 2



PLANTING TO SCREEN AND PROTECT

The U.S. Department of Agriculture's experience with shelterbelts in the Great Plains has yielded a great deal of information about screen plantings in general. The shelterbelt program revealed some things that need to be considered before the actual planting if the screen is to be fully successful. (1) The plant materials selected should grow rapidly to the size required. (2) Their full height and useful life span should be appropriate for the purpose. (3) Evergreens should be included in the planting when winter screening is important. (4) Screen species should be chosen for foliage density, crown shape, and retention of lower branches. Often all such characteristics are best combined in multiple-row plantings. These usually consist of one or more rows of a fast-starting hardwood and a row or two of conifers to improve winter screening and to help maintain density near the ground. In vegetatively propagated trees like poplar, it is possible to select species with narrow crowns and then use cuttings from a single, well-formed tree to improve the screen's uniformity.

F-495414, 495406



This strip-mined area once looked . . . something like this.



A former dustbowl area.

SCS-SD600

Species in a screen planting should be selected for beauty as well as use. Attractive cedars and spruces are available in many parts of the country, including the Great Plains. Rows of plants for wildlife food and cover can usually be included, with benefit to the appearance as well as the usefulness of the screen.

Multiple-row screens of mixed species need continuing care to maintain their effectiveness. Usually, some of the hardwood trees will have to be removed to favor and keep healthy the slower-growing evergreens. Sometimes the screen loses its effectiveness close to the ground because branches and sprouts are destroyed by natural pruning or grazing. Thinning the hardwood rows generally stimulates sprouting on the stumps and new branching on the trunks of the remaining trees, thus thickening the lower levels of the screen.

In the drier areas of the Great Plains, and in other dry areas, there are limits to the use of tree plantings of any kind except near water. But where highways cross the streams there is an opportunity to plant trees for shade for the benefit of the traveling public. Native species that can grow along the watercourse are often the best choice.



Evergreen trees planted on a curve provide a screen for headlights and safety for night driving; they serve as a beauty spot in daytime.

GOOD CARE PAYS

Trees, shrubs, and other plants are more than objects of living beauty; they have a definite usefulness and represent an investment in time, labor, and money. Consequently, they deserve proper care and maintenance. Healthy vigorous plants bear luxurious foliage, flowers, and fruits, are less susceptible to damage by insects and disease, and in general present an attractive appearance.

1. Treatments To Promote Healthy Growth

■ **Watering.** Ordinarily, native plants on normal sites do not need continued watering longer than a year after planting. When natural conditions are changed by construction projects, artificial drainage or watering may be required to maintain native plants. When plants show a lack of moisture, one or two deep waterings will usually carry established trees and shrubs through the emergency.

■ **Mulching.** This is effective for retaining soil moisture around plants and preventing weed growth. Wood chips, sawdust, peat, and composted leaves are all good mulching materials. They should not, however, be worked into the soil until they are well rotted and nitrogen fertilizer has been added. Mulch should be deep enough to protect the soil from sun and wind, and extensive enough to cover the area of major root development.



F-510935

Wood chips provide long-lasting insulation against both heat and cold.



This young sycamore tree has a better chance to survive because it has been properly pruned, wrapped, and staked.

F-510928

■ **Cultivation.** Cultivating will prevent the growth of undesirable or unsightly plants and may preserve soil moisture. Cultivated areas around trees and shrubs, group plantings, or flowerbeds should have well-defined, regular boundaries.

■ **Fertilization.** The vigor of most plants can be improved by using the right kind and amount of organic or chemical fertilizer. Fertilizer formulas and rates of application should be based on plant requirements and a soil analysis.

2. Protecting Desirable Plants From Damage and Competition

■ **Protective measures.** Common measures to prevent damage from animals include mechanical barriers such as woven wire guards around tree trunks to protect them from animals that eat bark, and fences to exclude domestic stock. Traps and repellants of vari-

ous kinds are used to discourage moles and gophers that feed on roots.

Mark young trees, shrubs, or groups of wild flowers with stakes to prevent damage by workmen or machines such as cultivators and mowers. Inspect plants periodically for the presence of injurious insects and diseases so that early protection or control measures can be taken to prevent serious damage and spread to other plants or other areas.

Provide well-defined paths in areas of heavy public use to prevent trampling of small plants and damage to root systems resulting from soil compaction in the root-feeding zone. Specimens that attract attention should be further protected by barriers.

■ **Eliminating competition and fostering growth.** Promptly remove and destroy plants that die and sickly plants that do not respond to cultural treatment. If there are indications that soil organisms or other soil conditions are the cause, corrective treatments such as soil sterilization, fertilization, or drainage should be completed before replanting.

Remove vegetation that hides or interferes with the desired development of plants to be featured. Species that sprout from roots or stumps should be pulled, grubbed out, or cut, and the stumps treated with chemicals to prevent sprouting. Cut stumps close to the ground so that they will be inconspicuous and rot faster.

Chip, burn, or haul away cut material. If the wood is chipped, scatter the chips or use them for mulch around selected plants. Burn material only where there is no danger of fire escaping or of heat damage.

Thin screen plantings, windbreaks, and other group or row plantings whenever they become crowded. Prune hedges and individual shrubs and trees as necessary to develop and maintain desired form. Flowering and fruiting of certain ornamental varieties are benefited by a seasonal pruning of unproductive growth. Remove diseased branches or other plant parts to prevent spread of the infection. Dead growth should also be removed. Cut live branches and stems when the plants are dormant. Pruning wounds that will not heal in a year or two should be treated to prevent entrance of rot.

3. Special Measures for Grasses and Forbs

Managing seeded areas to maintain herbaceous plant cover and protect the esthetic values requires controlling the use of the land. On rangelands grazed by livestock and big game, grazing must be carefully regulated to achieve a sustained high level of forage production. Likewise, plant cover on preferred recreation sites must be protected from trampling damage by regulating the number of visitors and avoiding too much use of critical areas. On harsh sites such as highway cuts, repeated fertilization may be necessary to maintain the desired plant growth.



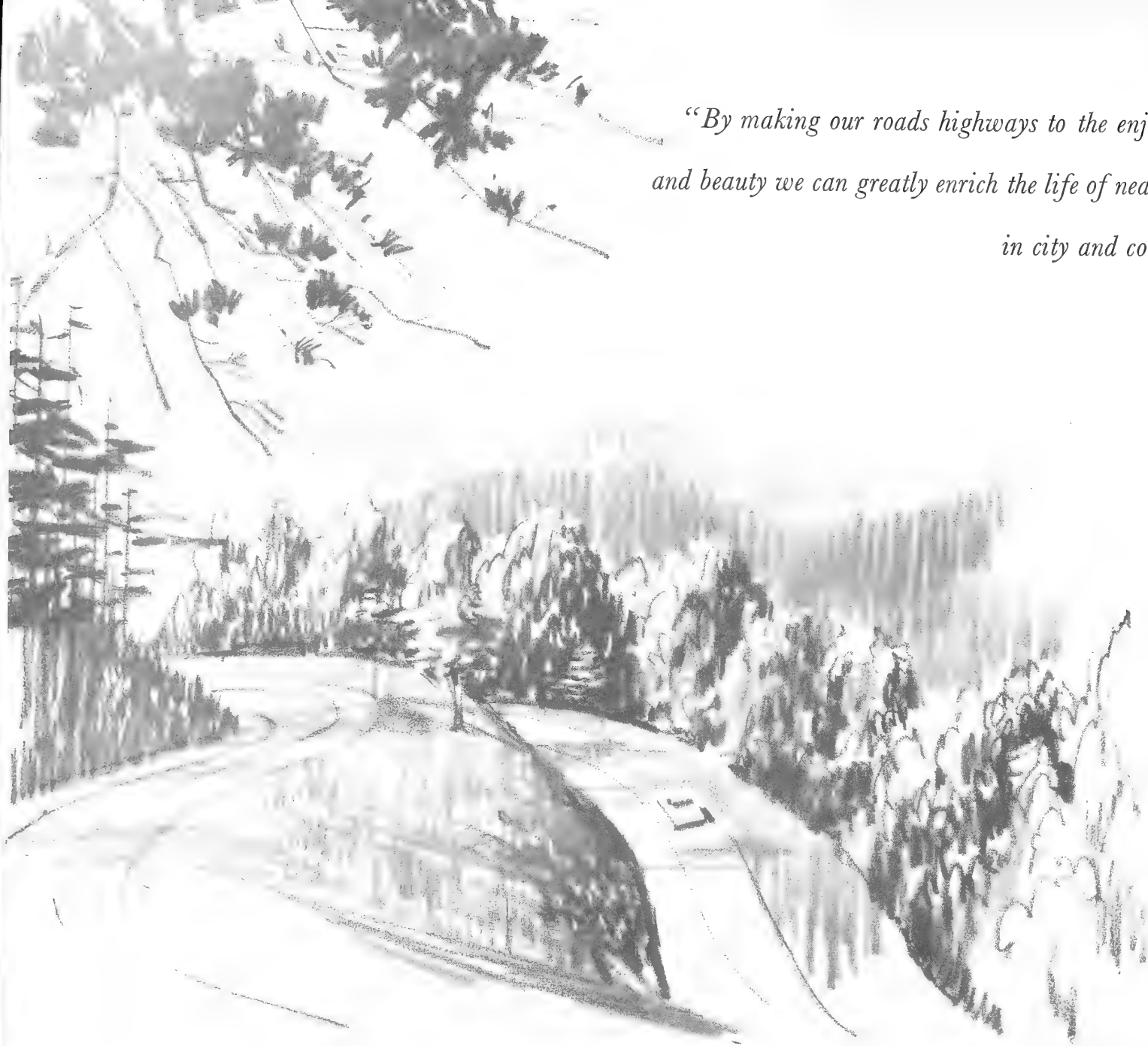
Most trees and tall shrubs should be staked as soon after planting as possible to protect them against wind and other storm damage.

Along highways mowing is often desirable to reduce the fire hazard and provide a pleasing appearance.

F-510926



*“By making our roads highways to the enjoyment of nature
and beauty we can greatly enrich the life of nearly all our people
in city and countryside alike.”*



Designed to Blend with Nature

Efforts to beautify a landscape must take into consideration not only the natural attractions but the approaches and facilities that can augment the beauty that is already there. Whether it is a highway, a trail, a campground, or a picnic shelter, the element of design must enter into making such constructions as near a part of the environment as possible. Blending man's work with the surroundings can help preserve the atmosphere of an area and heighten its attractiveness.

ROAD LOCATION AND DESIGN

A good scenic highway should be completely functional and in harmony with its environment and all other resource uses in the area. To accomplish this, the engineer must translate objectives and requirements into precise design criteria. This requires far more meaningful definitions of functional and environmental aspects of highway and road design than are usually provided the designer.

At present, too many designs are based on criteria which relate only to a class of road without regard to the peculiar use requirements and environment of a particular road. Basic design requirements are essential to a functional and safe highway. However, the designer should also consider the requirements of the area and its users and how the geometric road pattern blends with the other features of the landscape and enhances the visitor's enjoyment.

The elements of design must be thoroughly investigated by the planning and design engineer. User requirements are determined by the planned development of an area, the traffic between various points within the area, through traffic, and the specific requirements of the road user along the route. These are well defined in the Bureau of Public Roads planning procedures for metropolitan areas, and are adaptable to rural areas.

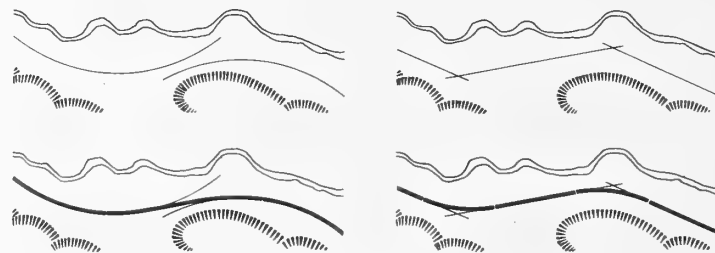
Determining precise road location is the most difficult job that can be assigned a highway engineer. Not all objectives are compatible. Total cost must be a strong factor. Various watershed problems such as erosion, pollution, change of ground water table, and local flooding must be either avoided or controlled. Other considerations include: (1) How well the road serves the abutting lands; (2) whether the highway provides reasonable access; (3) whether the area's resources development is enhanced rather than disrupted; and (4) economic aspects from the standpoint of the lowest operating costs to the user. The cost of maintaining the road structure and its appurtenances must be reasonable. Design elements of safety and esthetics, though difficult to evaluate on an economic basis, must also be seriously considered.

Many tools are available to assist in the solution of these problems. One of these is the topographic map, but others are equally important. Planning commission development plans and zoning maps should be used. For many areas, soil-type maps are published by the Soil Conservation Service of the U.S. Department of Agriculture. These maps are invaluable in locating suitable areas for roadbuilding and potential problem areas. They are also excellent guides to the type of developments which may eventually occur in an area. Other planned developments, such as reservoirs and flood control works which will be major attractions to the road user, must be considered in the initial road-planning stages.

In addition to published materials, many experts in fields such as

fish and wildlife, water development, and landscape architecture are available to the highway engineer for information on the environment in which he is building.

Watershed protection has been mentioned as a requirement in the location and design of roads. The natural characteristics of streams must not be interrupted adversely. Channel changes in firmly entrenched streams should be minimized, and encroachment on stream channels must be avoided or adequately protected. Additional measures, such as careful routing to prevent earth movement and balancing of cut and fill, should be taken whenever practical. Systems for the collection and discharge of surface water must be designed with due regard for the protection of embankments and fills and the erosive effect of additional water on minor channels. All disturbed areas subject to erosion must be revegetated or otherwise protected.



The designer must consider basic relations between road design and the terrain. Long straight tangents and short-radius curves should be avoided. In any terrain condition they appear foreign to the environment. The designer must break with the traditional concept of straight lines between location controls, connected by circular curves. Using flowing curves with short tangents or spirals can fit the road into the landscape.



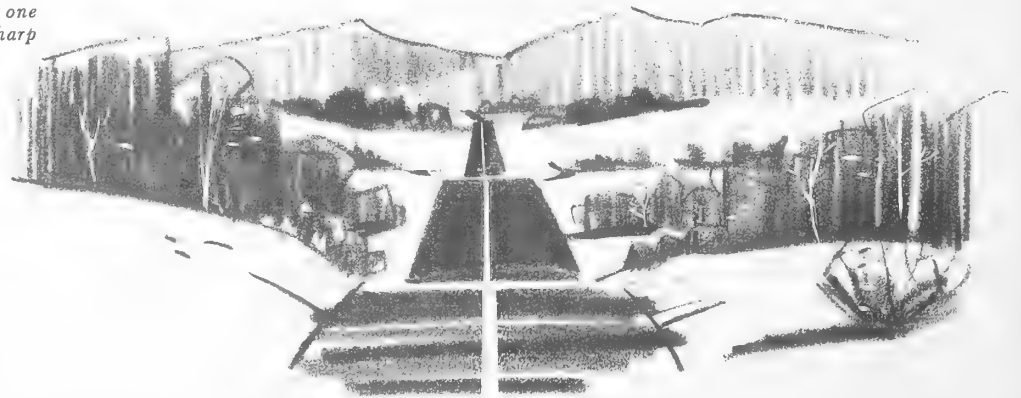
Ridging the work out in a direct line straight to the end, should be avoided, they are to be removed from the work. When possible, a combination curve should be used, when the vertical curve begins into the landscape. Vertical and horizontal curves should not begin or

terminate simultaneously, as this tends to emphasize the curves. If possible, the vertical curve should begin before the vertical curve section ends. This pleases the eye and, as an added safety feature, "leads" the driver into the horizontal curve.

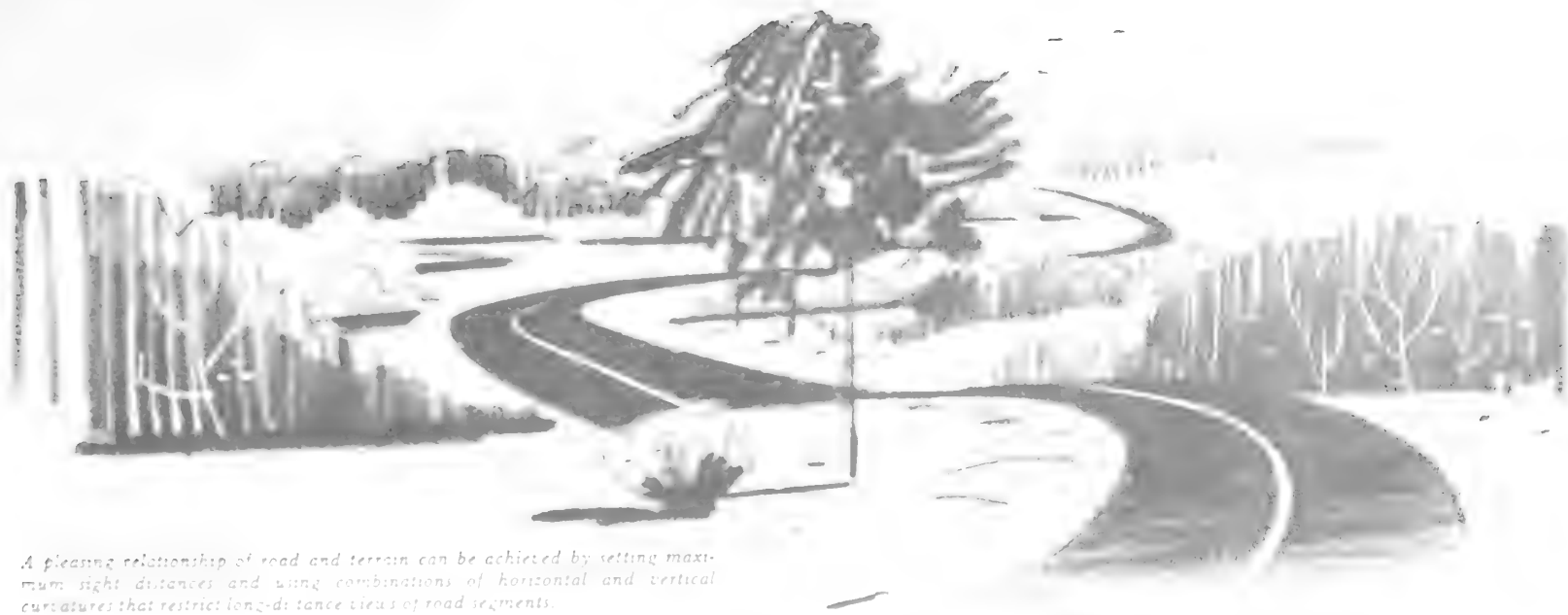




A divided highway can add to safe and relaxed driving, economy, and the beauty of the landscape. Each lane should seek its own best location, set apart from its twin by a variable-width median of natural terrain. Since each lane is screened and usually above or below its twin, the driver feels secure; he can enjoy his surroundings without distraction by oncoming headlights or traffic. In planning median strips, it is well to avoid leaving remnants of original vegetation which seem unsuited to their new environment. As one remedy, transition plantings close to the native trees can soften the sharp contrast of leafless trunks and roadway.

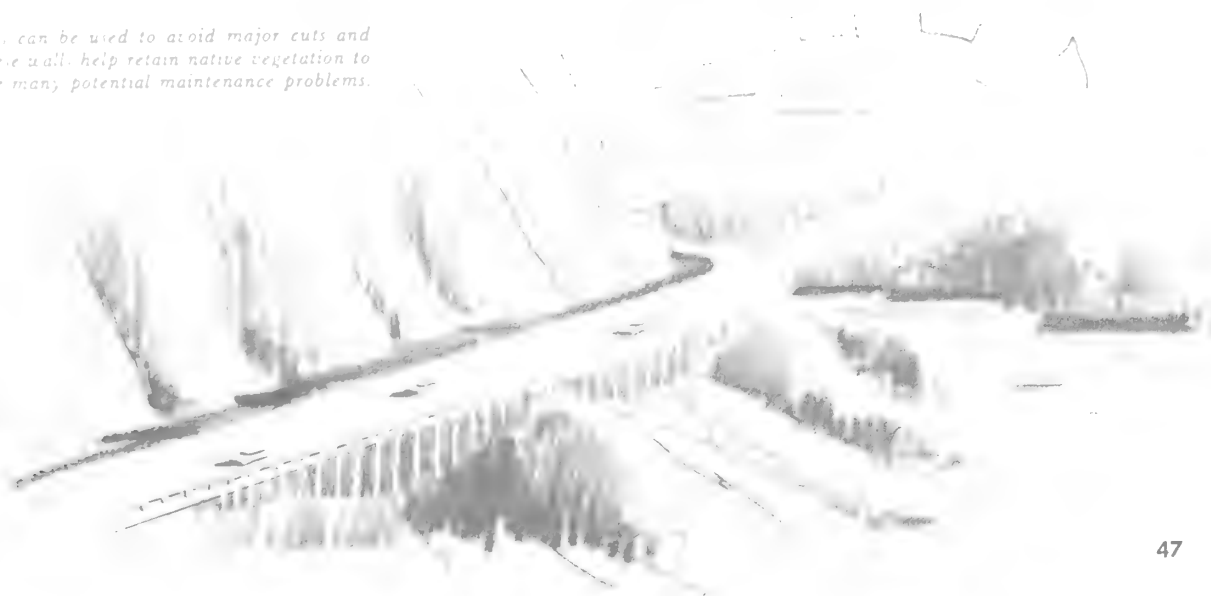


Discontinuous alignment, such as broken-back curves or hidden dips, tends to disrupt the relation of the road to the terrain.

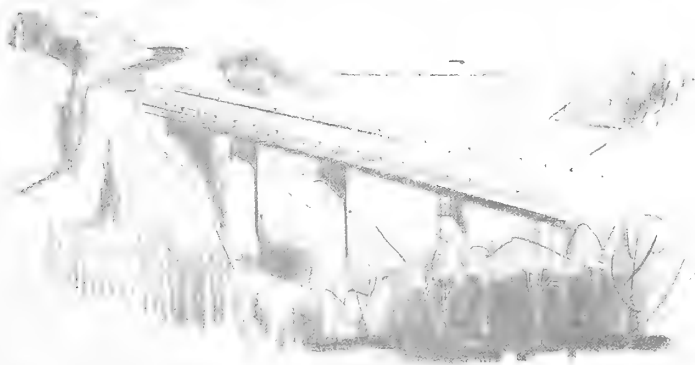


A pleasing relationship of road and terrain can be achieved by setting maximum sight distances and using combinations of horizontal and vertical curvatures that restrict long-distance views of road segments.

Timber, concrete, or metal crib wall, can be used to avoid major cuts and unsightly overcast in solid rock. These walls help retain native vegetation to protect the soil mantle, and eliminate many potential maintenance problems.



Bridges in scenic areas should normally have the major or heavier structural elements below the road surface. Structural members, guardrails, and railings located above the pavement should be designed to minimize blocking of the motorist's view of the scenery. Bridges that the public will pass underneath or see in profile should be designed as light-appearing, thin objects of functional beauty which do not obscure the landscape.



Landscaping Roads and Highways

Landscaping in large measure is an intrinsic part of location and design. If the road is located and designed to display and take advantage of the best of the natural scenery through which it passes, if it lies lightly upon the land, if it becomes an object of curving, flowing, functional beauty, then the rest of the landscaping job is a matter of preventing erosion, softening the transition from the old to the new, and applying design talents to obtain harmony and balance.

Perhaps the most important esthetic element in both highway location and landscaping is variety. The ever-changing scene—suddenly opened, well-framed vistas, blooming trees and shrubs, the interplay of light and shadow, fall colors, and snow on the conifers—all contribute to enjoyable and memorable travel. The monotony of a seemingly endless dark tunnel, caused by cutting a highway through dense forest, can be relieved by carefully skirting meadows or crossing vantage points from which such openings can be seen. At appropriate locations the trees can be cut back or thinned to produce an irregular edge and glades where attractive trees, shrubs, and sturdy species of ground cover can be planted.





Landscape plantings have many more specific uses. They can eliminate headlight glare between lanes of a divided highway. Multitiered rose hedges have safely caught or slowed automobiles that veered off the pavement. Long rows of these plants, however, can become more of a hazard if not installed with discretion. Trees and shrubs form excellent sound barriers to separate highway noise from adjacent residential or park areas. Plants that provide food for interesting species of wildlife can be incorporated. Wild creatures should be thus attracted to areas where they can be conveniently and safely observed by the traveling public, but will not become a hazard on the highway.

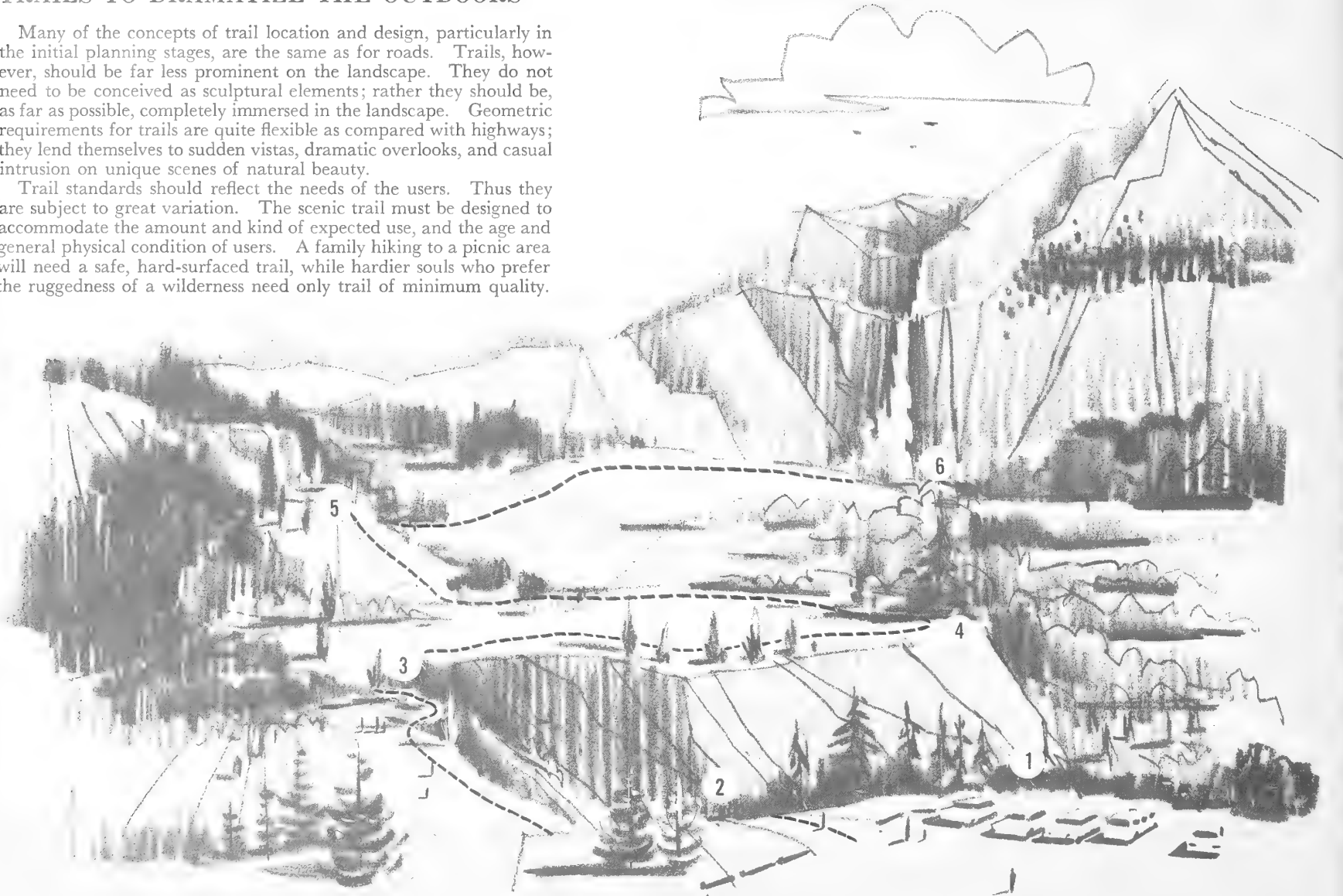


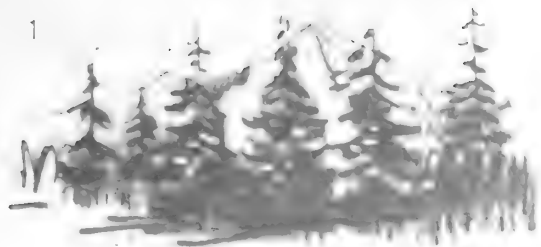
Plants are commonly used to control erosion. If properly located they will also control snow drifting and thus reduce maintenance costs. Trees are often used to help guide motorists around curves and through intersections. Proper planting and thinning can enhance the traveler's enjoyment of near and distant scenery.

TRAILS TO DRAMATIZE THE OUTDOORS

Many of the concepts of trail location and design, particularly in the initial planning stages, are the same as for roads. Trails, however, should be far less prominent on the landscape. They do not need to be conceived as sculptural elements; rather they should be, as far as possible, completely immersed in the landscape. Geometric requirements for trails are quite flexible as compared with highways; they lend themselves to sudden vistas, dramatic overlooks, and casual intrusion on unique scenes of natural beauty.

Trail standards should reflect the needs of the users. Thus they are subject to great variation. The scenic trail must be designed to accommodate the amount and kind of expected use, and the age and general physical condition of users. A family hiking to a picnic area will need a safe, hard-surfaced trail, while harder souls who prefer the ruggedness of a wilderness need only trail of minimum quality.





1
First Glimpse of View



2
Better Glimpse of View



3
Intimate View of Small Lake



4
Well-Formed Tree in Forest Glade



5
Small Waterfalls



6
Panoramic View From Overlook

A trail should have a definite purpose, such as leading to a scenic overlook, historical site, or wildlife sanctuary. It can be designed in a subtle manner, building suspense or anticipation by allowing occasional brief or incomplete views or hints of the final goal. It can lead the traveler from one interest point to another, but not necessarily to the point itself. The trail might allow a glimpse of a small pond or take the traveler to within earshot of a waterfall. The

visitor can then detour to "discover" the scene, as if no one had ever been there before. The trail also need not arrive at its destination by the easiest or most direct route. Upon reaching his goal, the traveler should have a feeling of accomplishment, of having communed with nature, of having "found" most of the interest points along the way, of having struggled to the top of the overlook where he can rest and enjoy his prize—the scenic view spread out before him.

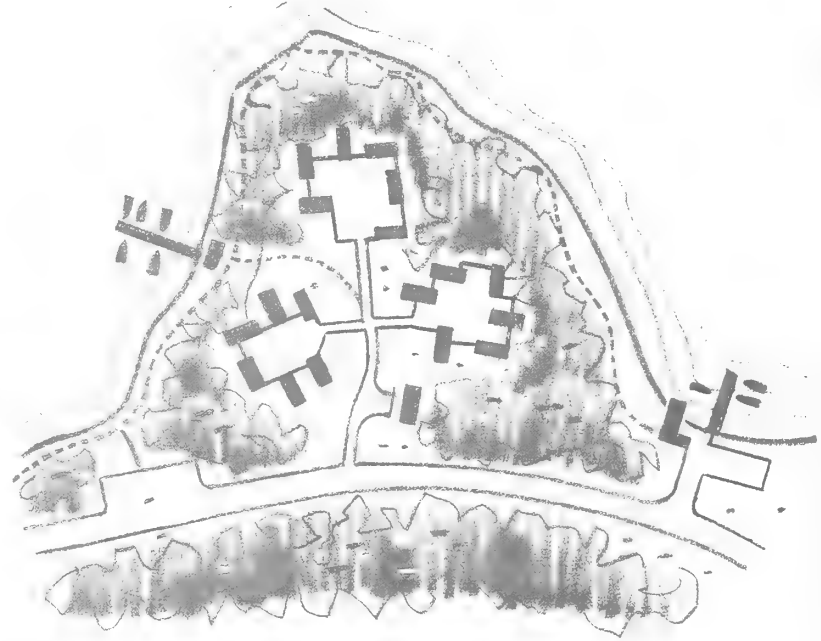
FITTING FOREST STRUCTURES INTO THE LANDSCAPE

A structure's ideal function and form in a forest setting should be derived from a realization of the best possibilities of the site and brought into being by the creative talents of a trained designer (usually a professional architect or landscape architect). On sites where groups of forest structures are involved, such as resorts, winter sports lodges, and summer homes, it is often best to centralize or cluster the buildings. This method of planning makes central utility and sanitary systems, roads, and parking feasible, and provides

privacy through architectural devices rather than through distance. Proper use of screen fences and walls, hedges, and decks allows the necessary living area to be compressed and pulled back from the major natural attraction. The surrounding landscape may then be left wild and devoted to common enjoyment. In this way the land needed for human occupancy can be developed without destroying those natural features of the site which made it so attractive in the beginning.



A resort with 18 cabins on individual lots.—Most of the land is no longer open or natural; there is no public access to shore; residents have access only to their own strip of beach.



A resort with 18 cabins "clustered".—A public trail follows the shore; there is public boating and private boating; and most of the land and shore remains natural and open to all.

The "clustering" concept can also be applied to billboards and other highway advertising. Scattered advertising signs can be removed from our roads and replaced by selected, well-designed roadside turnouts where an attractive sign mall advertises business and products available in the nearby community. A small building may be added for the dispensing of pamphlets and information, as well as a telephone shelter for those who wish to make reservations or appointments.

To be acceptable in the natural environment, individual forest structures such as observation-point shelters, informational signs and exhibits, recreation facilities, and visitor centers should be conceived in terms of beauty of both form and function.



Functional Beauty

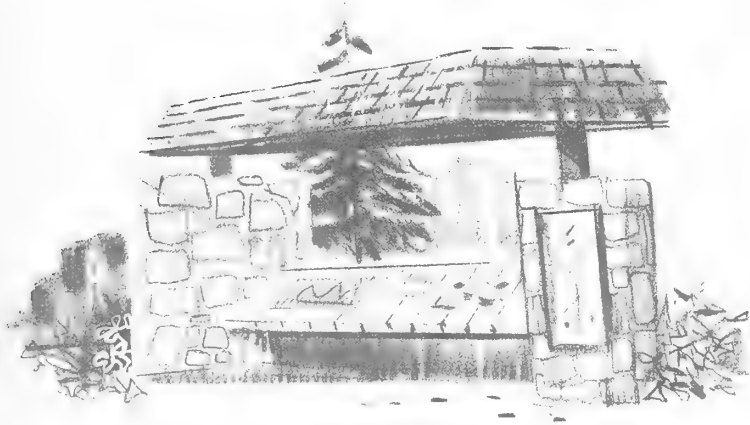
A truly effective structure must be convenient, work well, and serve its intended purpose. User traffic should flow to, into, through, around, and away from the structure in a planned, logical sequence. Its parts and materials must be in balance with each other and with the type and amount of expected use. For example, durable flooring should be used where traffic is heaviest, and adequate seating should be available where elderly people tend to pause and rest.



Beauty of Form

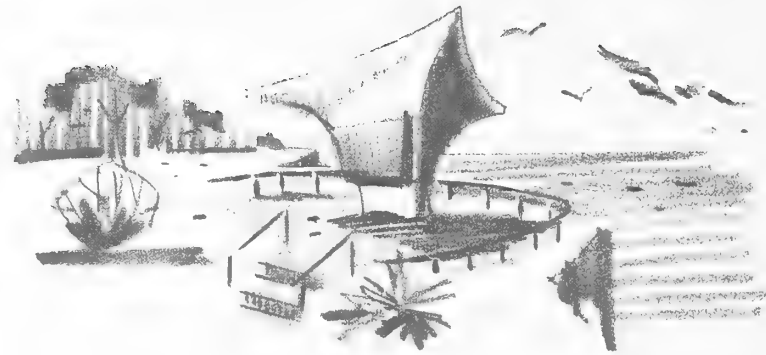
The beauty of the forest structure is dependent, at least in part, upon the beauty of the site. The two must be integrated in a way that emphasizes the best features of each. If the designer decides that the structure (a picnic or overlook shelter, for example) should be in complete harmony with its surroundings, the site itself should be allowed to suggest the plan, form, and location. The site should be altered only as necessary to take advantage of its best features. Masonry, using local rock, could exhibit the desired features of permanence and firmness. In this way, the transition from the natural surroundings to the man-made structure, from the exterior to the interior, is made gradual and unobtrusive.

Landscaping should consist primarily of on-site plants left in place and protected during construction, or moved into place to complement the preserved plants and the structure. Lichen-covered rocks can be preserved or carefully moved to heighten the harmonious

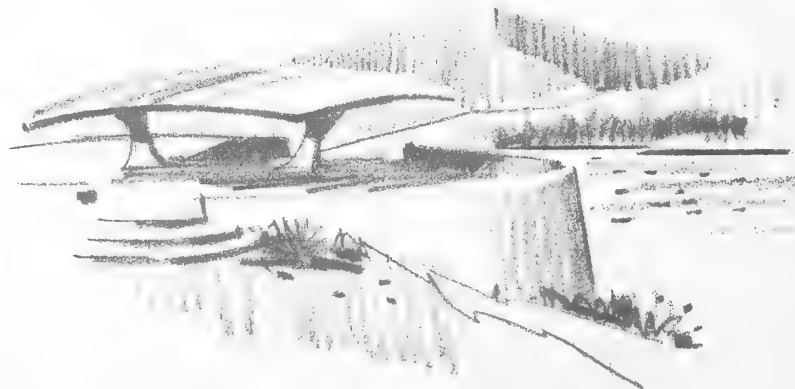


effect. Natural pools, rushing streams, or falls can be used or carefully altered to emphasize the wondrous ability of still and moving water to evoke in man the moods of relaxation, reflection, and excitement.

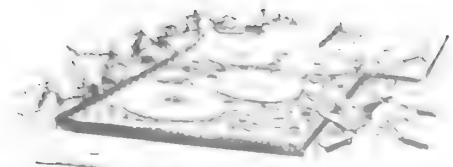
If the designer decides, on the other hand, that the structure (a stop sign or special visitor center, for example) should stand out from its surroundings, he may emphasize contrast to attract attention. Some sites, especially the relatively flat or unspectacular ones, benefit by having their best features accentuated through contrast with imaginatively designed structures. Landscaping in the immediate vicinity of a contrasting structure might be used to heighten these effects. Plants of unusual shape, color, or flower; semiformal layouts of paths and terraces; and fountains or artificial falls may be tastefully used by the designer to add interest to a drab site.



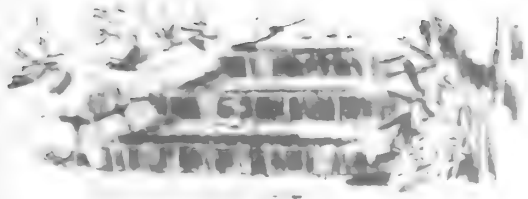
Most successful structures are designed as an appropriate mixture of harmony and contrast. How well the structure blends with its surroundings, how much it claims the space around it, or how much it contrasts with the environment should be evolved through the creative talents of the trained designer. If all of this is done with perception and imagination, if the site and the structure work together, if the result is one of visual attractiveness and functional unity, then we have achieved beauty.



appearance



A use for discarded railroad ties or rough-sawn timbers—outdoor stair treads



A pleasing effect in fencing, obtained by contrasting the rough texture of cedar, hick, with the smooth surface of stained or overlaid plywood




Designed for contemplation and, for interest—a focal point.

FANCIFUL USE OF WOOD, STONE, WATER

Wood, stone, and water are a natural part of the landscape. When used with imagination and skill in structures foreign to the landscape, they can soften the fact that an alien element has been introduced, or actually heighten an appreciation of a natural setting. Some of these materials are available in manufactured forms, such as exposed-aggregate concrete and laminated wood beams. When applied with taste, they are both economical and appropriate. Dis-

carded items such as railroad ties and broken pavement can occasionally be salvaged and used effectively. Man will always need economical, durable, and esthetically pleasing materials to walk upon and climb upon, to hold back the earth, to retain privacy or control people and animal traffic, and to form placid pools and rushing falls.



“Old and young can participate.

*Our doctors recommend
and encourage such activity
for fitness and fun.”*

Enriching the Recreation Experience

Interests of recreation visitors vary widely; so must the provisions for their recreation experience. Some visitors prefer outdoor activities which make few demands upon the land resource: photography, painting, walking, relaxing, and nature study. Here use is often dispersed, and the manager's job, which is relatively easy, is to protect the setting and provide only primitive conveniences. Others are interested in an activity or sport which results in greater concentrations of visitors as in driving for pleasure, camping, picnicking, or water skiing. Here more intensive developments are usually necessary.

In either case a recreation area, to be beautiful and enjoyed, must embrace a pleasing combination of topography and plant or animal life. It must be in harmony with its natural surroundings and with other forest and recreation uses. To preserve and maintain the natural attraction and its beauty while providing for its use, the manager must understand each use and its impact on the resource. And his task must go beyond that of managing the resource and its facilities. He must provide an opportunity for the visitor to gain a better understanding and appreciation of nature and of the use of land. Visitors of all ages can be given an opportunity to participate through nature centers, informational signs, and outdoor classroom activities.

PICKING THE RIGHT PLACE AND PROTECTING IT

Design for visitor facilities must consider topography, soil, and local climate. For example, a small hollow can serve to hide a necessary but unattractive parking lot, sanitary structure, or work area. A picnic or campsite should take advantage of a gentle slope with good drainage, correct exposure to the sun, and prevailing winds for coolness or warmth. To prevent diminishing the value of the special attraction that draws visitors, a camp or picnic ground and related installations should be set apart from that attraction. If the area suitable for recreational development is small, camp and picnic facilities can be clustered to minimize preemption of the natural scene.

Protection of soils and vegetation between individual camp or picnic units often requires controls, such as barriers of vegetation, wood, or stone. Even when protective measures are taken, however, wear and damage will occur. Gradual attrition of site values must be offset by scheduling regular and continuing maintenance—planting, fertilization, or irrigation. Many of the principles of location, protection, and maintenance can also be applied to more extensive landscapes. Overdevelopment along scenic drives, for instance, can be avoided by grouping service and business structures close to large recreation site developments.

Streams and lakes contribute immensely to the beauty of the environment, reflecting and serving as contrasts to surrounding trees and mountains, supporting aquatic life, or providing the means for many water-oriented recreational activities. Of primary concern is the purity and clarity of the water itself. If its beauty is to be fully realized, we must insure against abnormal siltation, and biologic, chemical, and thermal pollution. To this end, cooperation from the public and management measures well beyond the recreational attraction itself are often necessary. In providing for appropriate access and use, special controls or treatments are often needed to protect delicate vegetation and unstable soils on the banks of streams, lakes, and reservoirs. Developments, roads, and trails must be located to minimize environmental disturbance.

Water attracts a wide variety of activities: nature study, fishing, swimming, canoeing, power boating, water skiing—uses which often conflict. Each has its place. Full use and enjoyment of a beautiful setting often require the separation of uses as, for example, assigning appropriate areas or times for each activity.

ACCENT ON HISTORY

Trails and other recreation travel routes can be much more than a “way to get there.” With appropriate signs, maps, and guide leaflets, travel routes can become an open book on the natural and cultural history of the countryside. New routes should be located so as to highlight points of interest and vary the range and content of the scenic view. Locating overlooks with the broadest possible view is not always advisable; rather, the point chosen should give the most meaningful or dramatic view.

Even in areas set aside for their natural or wild character, certain management or control measures must be applied. Dispersed use should be encouraged, for large groups tend to destroy the mood and character of wild surroundings as well as the resource itself. Management of the area should insure that dispersed rather than concentrated use prevails. And natural beauty can best be maintained by persuading visitors to keep the area clean.

Much of America's beauty is related to its cultural as well as its natural history. Points of interest should be identified. An individual tree, a stand of trees, or a dwelling may commemorate some event in history. In such places, adequate space should be provided to meet the ecological and esthetic requirements of the site as an aid in recreating or maintaining the original mood and beauty.

This walk-in picnic unit shows careful adaptation and use of native materials to maintain the beauty of the setting.



F-468413



The natural character of the beach and cliffs is protected by spacing roads, camp units, and powerlines well away from the attraction. Notice how natural topography was used to separate the organization camp foreground from the family campground above, and the numerous barriers.

F-505749

F-510022



People of all ages look to the outdoors for beauty and fulfillment. Here artists find a pleasing combination of natural topography and resource use. The resource manager must consider the visual effects of his work, and strive to add beauty and meaning to the environment.

Wild flowers bloom when protected by barriers at each camp unit. Encouragement of native vegetation helps blend development with the natural setting.

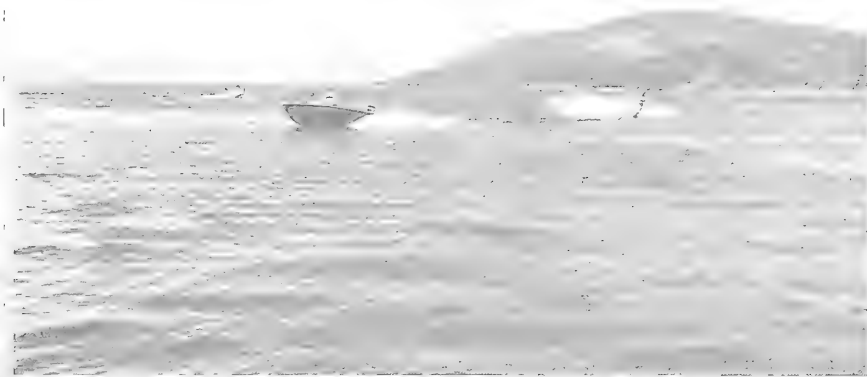


F-505404



Outdoor classrooms further the understanding of nature, and its deeper meaning and beauty. The manager should consider not only the outward visual composition of the resource, but the more subtle and hidden sources of knowledge and esthetic value.

F-497200



F-499219



F-498990

Each water use has its place, but full enjoyment of the natural scene often requires separation of uses.

Water must be clear and pure to be fully enjoyed. Water purity often requires resource management far beyond the recreational attraction itself.



F-502477



F-501205



*Some of the water is left in the station
to allow the water to flow both at the top and
bottom.*



*Trails can display both
our natural and cultural
heritages. Here the bed
of an old narrow-gage
railroad is used to tell
a fascinating story.*



F-502189

*Overlook can be located
not directly across the bridge
area, but a few miles to
the dramatic experience*



F-105898



F-498084



F-480822



To preserve the beauty and scientific interest of trees such as these unique foxtail pines, enough area must be provided to meet the ecological requirements of the whole plant community.

Founder's tree in Humboldt County, Calif. This giant redwood, believed to be the world's tallest tree, deserves special care.

SIGNS THAT ENHANCE ENJOYMENT

Signs are a standard fixture in the American outdoors. When designed with care, they complement the beauty and use of the natural scene. They are a means of communication in the outdoor environment. They guide the traveler to his destination, remind him of rules of use and safety, warn him of danger, inform him of things and events, and identify forest and park boundaries and activities within them.

Signs that guide, remind, and warn are placed prominently where they best serve their purpose. Identification signs are placed to indicate ownership or management jurisdiction of forest lands and to call attention to ranger stations, information centers, or other headquarters where information and services are available. Informational and interpretive signs are useful and welcome in places such as roadside rests, scenic overlooks, information sites, and along forest trails. Relaxed and seeking diversion, visitors like to read an attractive sign that tells something interesting about the locality. Interpretive signs enrich the visitor's experience in the forest and

and include longer narrative messages.



F-510921

Everyone likes to know where he is! At forest and park entrances, easy-to-see signs can be made from native materials that blend with the environment.



F-510972

Signs can make one feel "I was there" and add to the outdoor experience.



F-510985

Signs in the high country must be as rugged as the individuals who seek them out for direction.



ONE BOARD

NEVER MORE THAN FIVE

F-510969

Signs that inform people of services can be attractive as well as useful.



F-510966

The sign that forewarns yet fits the landscape helps coordinate traffic flow and use of resources, contributing to the enjoyment of the outdoors.



F-503653

Caution and other warning signs to inform people of rules affecting them are illustrated by this relatively simple one featuring the hero of millions of youngsters of all ages.

Fitting the Sign to the Environment

All signs in a specific area should be planned for at one time. This helps to keep signs to the least number and prevents duplication, conflict, and omissions. Signs in a common zone should complement one another in theme as well as in design.

For best results, the site is selected and its features are known before the sign is designed. A site plan is commonly used for this

purpose. The designer must know the site's limitations and its available opportunities; for example, whether the sign for the site can be read from a car at high speed or whether it is best for the relatively unhurried atmosphere of a rest area, information turnout, or overlook.

Signs that attract visitors should be landscaped to assure safe stopping, easy walking, and a pleasing atmosphere. Messages should be related to what can be seen from scenic turnouts. An important goal is to achieve balance among all design features including association with the environment. Signs are properly designed and placed when the functional purpose is served, yet the sign or poster itself is hardly noticed.

Designing an Attractive Sign

Design that appeals to sight and emotion, and has imagery, dignity, and purpose usually leads to public acceptance. For example, a historical sign that creates the feeling that "but for the years, I was there" has succeeded in its mission.

The text is the principal feature of the sign and is the reason for the sign's existence. All other features are designed to exhibit the message in its most effective and pleasing form. Readability, brevity, and accuracy are prime considerations when preparing texts for all signs. Other considerations for signs that inform or interpret include friendly and informal tone, and development of a single subject.

The textual effectiveness and attractiveness of the sign may be improved with good headlines, a wise choice of lettering, skillful use of art work, and professional blending of colors. Use of a uniform shape, arrangement of symbols, and colors for the same kind of sign are also good design techniques. These techniques should complement, but never overwhelm the sign's message.

Wood is a widely used material for signs in a forest environment. It is strong, attractive, and versatile. Other materials are used with wood or alone if special properties are required. Once the sign is in place, it must be kept as near to its original specifications as possible through maintenance and scheduled replacement.

LINKING BEAUTY AND UTILITY THROUGH COMMUNICATION

People respond to scenic beauty through visual and thought impressions. What the eye sees can create an emotional response to a landscape. Often this response is stronger if one is also knowledgeably aware of the natural and human forces at work in nature.

Through verbal and visual communication people can come to know and appreciate what they are seeing and thus, perhaps, perceive beauty and enlarge their concepts of it. Perception of beauty is one goal of an informational program; an equally important goal is the understanding of the relationship between man and the natural resources, including the management and use of these resources.

Many media are available for informing the public about the scenic outdoors. Some of these involve personal services in the form of campfire programs, conducted walks, informal talks, and public contacts at information stations. Other media allow visitors to find out things by themselves. These include signs along highways and trails, exhibits indoors and outdoors, audio stations, and publications.

It is important for the planner to become familiar with these tools and learn the advantages and limitations of each. In this way it will be possible to select the communications medium that is best



F-458553

suited for the purpose at hand. The following are steps in planning for successful public communications:

- Determine the geographical extent of the area your program will cover. The area should be a planning unit where all information devices and programs are interrelated and considered together. In one place, the unit might be a single vista point, requiring only one sign; in another, it might include a whole park or forest where several devices will be used.
- Within the area selected, make a survey to identify needs and opportunities for telling about beauty and use.
- Analyze potential audiences in such terms as their size, how they will use the area, and their interests.
- Select the site where each opportunity can be best developed.
- Select the best information medium for each communications need.
- Prepare a well-coordinated plan of action for your outdoor information program. This should include what is to be done; where it is to be done; development and operational schedule; estimate of development and maintenance costs; and manpower needed to operate and maintain the program.

Communications at Work

Here are two scenes. One is the work of nature; the other, the work of man and nature in partnership. Examine the accompanying texts and see how each is intended to develop in the reader an appreciation for the scene.

SENTINELS OF TIME

Many of these bristlecone pines were living when the pyramids of Egypt were built and they are still living today. By surviving for more than 4,000 years they have earned the distinction of being the oldest known living things on earth.

Here they stand silhouetted against the sky, gnarled with age, battered by the centuries, clinging to life in a harsh environment.



F-506386



F 498544

FOREST OF WHITE PINES

Take a moment and stroll in the cool shade of this forest. It is a friendly place. Enjoy the soft forest carpet underfoot, the evergreen fragrance, the murmur and sway of trees in the breeze, a fleeting glance at a red squirrel or pine warbler.

Without man's help this white pine forest would not exist. It is 75 years old, and is believed to be the oldest white pine plantation under management in the United States. Through the years foresters have protected the trees from fire and disease, applied scientific forestry practices, and supervised harvests from time to time, insuring continuous growth of the forest and enduring beauty.

Appendix

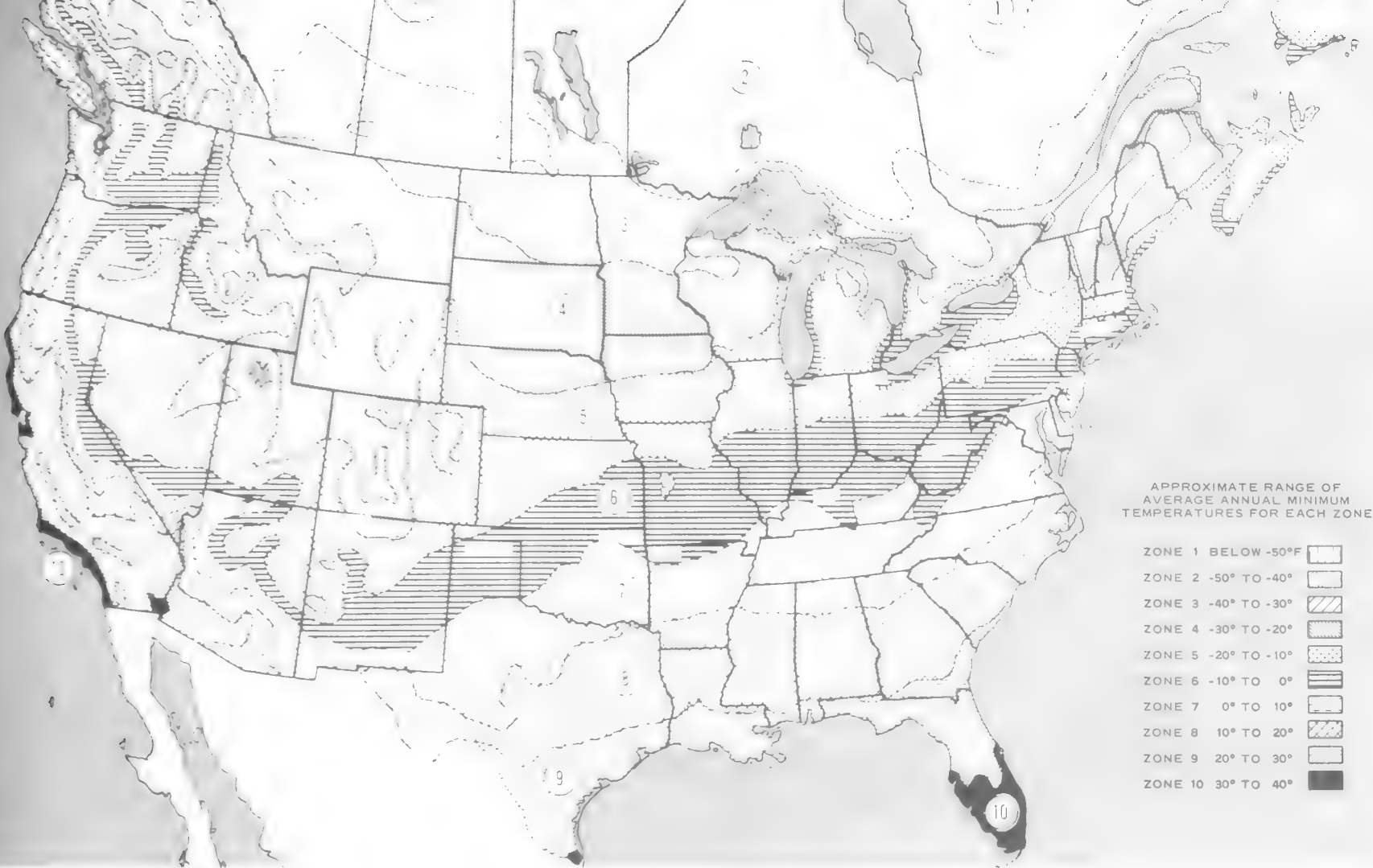
PLANTS FOR BEAUTY

TREES WITH ATTRACTIVE FLOWERS

| COMMON NAME | SCIENTIFIC NAME | HARDINESS ZONE |
|---------------------|--------------------------------|-------------------|
| Northern catalpa | <i>Catalpa speciosa</i> | 5 |
| Southern catalpa | <i>Catalpa bignonioides</i> | 5 |
| Cherry | <i>Prunus</i> spp. | 4 |
| Crabapple | <i>Malus</i> spp. | 4 |
| Flowering dogwood | <i>Cornus florida</i> | 5 |
| Pacific dogwood | <i>Cornus nuttallii</i> | 7 |
| Fringetree | <i>Chionanthus virginicus</i> | 6 |
| Hawthorn | <i>Crataegus</i> spp. | 4, 5 |
| Black locust | <i>Robinia pseudoacacia</i> | 5 |
| Southern magnolia | <i>Magnolia grandiflora</i> | 7 |
| Red maple | <i>Acer rubrum</i> | 5 |
| Yellow-poplar | <i>Liriodendron tulipifera</i> | 4 |
| Redbud | <i>Cercis</i> spp. | 5 |
| Mountain silverbell | <i>Halesia monticola</i> | 5 |
| Bigleaf snowbell | <i>Styrax grandifolia</i> | 7 |
| Sourwood | <i>Oxydendron arboreum</i> | 5 |
| Yellowwood | <i>Cladrastis lutea</i> | 3 |

EVERGREEN TREES FOR SCREENS

| | | |
|----------------------|---------------------------------|------|
| Atlantic white-cedar | <i>Chamaecyparis thyoides</i> | 5 |
| Incense-cedar | <i>Libocedrus decurrens</i> | 5 |
| Northern white-cedar | <i>Thuja occidentalis</i> | 3 |
| Port-Orford-cedar | <i>Chamaecyparis lawsoniana</i> | 5 |
| Arizona cypress | <i>Cupressus arizonica</i> | 7 |
| Douglas-fir | <i>Pseudotsuga menziesii</i> | 6-8 |
| Eastern hemlock | <i>Tsuga canadensis</i> | 4 |
| Western hemlock | <i>Tsuga heterophylla</i> | 5-8 |
| American holly | <i>Ilex opaca</i> | 6 |
| Eastern white pine | <i>Pinus strobus</i> | 4 |
| Ponderosa pine | <i>Pinus ponderosa</i> | 4, 5 |
| Red pine | <i>Pinus resinosa</i> | 4 |
| Spruce pine | <i>Pinus glabra</i> | 8 |
| Sugar pine | <i>Pinus lambertiana</i> | 6 |
| Western white pine | <i>Pinus monticola</i> | 5 |
| Eastern redcedar | <i>Juniperus virginiana</i> | 2 |
| Western redcedar | <i>Thuja plicata</i> | 5 |
| Blue spruce | <i>Picea pungens</i> | 3 |
| White spruce | <i>Picea glauca</i> | 2 |



THE ZONES OF PLANT HARDINESS

The Plant Hardiness Zone represents the coldest zone in which a particular species might survive freezing weather. The species would be expected to be hardy in warmer (or higher numbered) zones. Other factors, such as precipitation and kind of soil, also affect how well the tree, shrub, or herb will grow.

TREES WITH STRIKING FALL COLORING

| | | |
|-----------------------|--------------------------------|---|
| Birches | <i>Betula</i> spp. | 2 |
| Blackgum (tupelo) | <i>Nyssa sylvatica</i> | 5 |
| Flowering dogwood | <i>Cornus florida</i> | 5 |
| Pacific dogwood | <i>Cornus nuttallii</i> | 8 |
| Hickories | <i>Carya</i> spp. | 5 |
| Maples (most species) | <i>Acer</i> spp. | 5 |
| Black oak | <i>Quercus velutina</i> | 5 |
| Pin oak | <i>Quercus palustris</i> | 5 |
| Red oak | <i>Quercus rubra</i> | 5 |
| Scarlet oak | <i>Quercus coccinea</i> | 5 |
| White oak | <i>Quercus alba</i> | 5 |
| Sassafras | <i>Sassafras albidum</i> | 5 |
| Sweetgum | <i>Liquidambar styraciflua</i> | 5 |

ORNAMENTAL SHRUBS

| | | |
|--------------------------------|--------------------------------|---|
| Apache-plume | <i>Fallugia paradoxa</i> | 5 |
| Azaleas | <i>Rhododendron</i> spp. | 3 |
| Carpenteria | <i>Carpenteria californica</i> | 8 |
| Ceanothuses | <i>Ceanothus</i> spp. | 8 |
| Cherries, chokecherries, plums | <i>Prunus</i> spp. | 2 |
| Elders, elderberries | <i>Sambucus</i> spp. | 3 |
| Fremontias | <i>Fremontodendron</i> spp. | 8 |
| Fringetree | <i>Chionanthus virginicus</i> | 4 |

| | | |
|-------------------------|-----------------------------|---|
| Hawthorns | <i>Crataegus</i> spp. | 4 |
| Hollies | <i>Ilex</i> spp. | 3 |
| Hydrangeas | <i>Hydrangea</i> spp. | 4 |
| Locusts | <i>Robinia</i> spp. | 3 |
| Mescalbean | <i>Sophora secundiflora</i> | 7 |
| Mockoranges | <i>Philadelphus</i> spp. | 4 |
| Mountain-ashes | <i>Sorbus</i> spp. | 2 |
| Mountain-laurel | <i>Kalmia latifolia</i> | 4 |
| Oregon-grapes, mahonias | <i>Mahonia</i> spp. | 5 |
| Rhododendrons | <i>Rhododendron</i> spp. | 3 |
| Wild roses | <i>Rosa</i> spp. | 3 |
| Salal | <i>Gaultheria shallon</i> | 5 |
| Stewartias | <i>Stewartia</i> spp. | 5 |
| Sumacs | <i>Rhus</i> spp. | 2 |
| Viburnums | <i>Viburnum</i> spp. | 2 |
| Yellow-trumpet | <i>Tecoma stans</i> | 8 |
| Yuccas | <i>Yucca</i> spp. | 4 |

SHRUBS FOR HEDGES

| | | |
|--------------|-------------------------|---|
| Hawthorns | <i>Crataegus</i> spp. | 4 |
| Hollies | <i>Ilex</i> spp. | 3 |
| Osage-orange | <i>Maclura pomifera</i> | 5 |
| Wild roses | <i>Rosa</i> spp. | 3 |
| Viburnums | <i>Viburnum</i> spp. | 2 |

TALL SHRUBS FOR SCREENS AND WINDBREAKS

| | | |
|--------------------------------|----------------------------|---|
| Silver buffaloberry | <i>Shepherdia argentea</i> | 2 |
| Cherries, chokecherries, plums | <i>Prunus</i> spp. | 2 |
| Hawthorns | <i>Crataegus</i> spp. | 4 |
| Junipers | <i>Juniperus</i> spp. | 2 |
| Osage-orange | <i>Maulandibifera</i> | 5 |
| Serviceberries | <i>Amelanchier</i> spp. | 4 |
| Sumacs | <i>Rhus</i> spp. | 2 |
| Viburnums | <i>Viburnum</i> spp. | 2 |

SHRUBS FOR EROSION CONTROL

| | | |
|--------------------------------|----------------------------|---|
| Ceanothuses | <i>Ceanothus</i> spp. | 8 |
| Cherries, chokecherries, plums | <i>Prunus</i> spp. | 2 |
| Wild roses | <i>Rosa</i> spp. | 3 |
| Sagebrush | <i>Artemisia</i> spp. | 5 |
| Snowberries, coralberries | <i>Symphoricarpos</i> spp. | 2 |
| Sumacs | <i>Rhus</i> spp. | 2 |
| Willows | <i>Salix</i> spp. | 2 |
| Yuccas | <i>Yucca</i> spp. | 4 |

SHRUBS FOR GROUND COVER

| | | |
|------------------------|--------------------------------|---|
| Bearberry | <i>Arctostaphylos uva-ursi</i> | 2 |
| Bunchberry | <i>Cornus canadensis</i> | 2 |
| Creeping juniper | <i>Juniperus horizontalis</i> | 2 |
| Oregon-grape, mahonias | <i>Mahonia</i> spp. | 5 |

| | | |
|-----------------|----------------------------------|---|
| Partridge-berry | <i>Mitchella repens</i> | 3 |
| Salal | <i>Gaultheria shallon</i> | 5 |
| Sumacs | <i>Rhus</i> spp. | 2 |
| Yellow-root | <i>Xanthorhiza simplicissima</i> | 4 |

SHRUBS FOR WILDLIFE FOOD AND COVER

| | | |
|--------------------------------|----------------------------|---|
| Crab apples | <i>Malus</i> spp. | 2 |
| Bayberries, waxmyrtles | <i>Myrica</i> spp. | 2 |
| Blueberries | <i>Vaccinium</i> spp. | 2 |
| Cherries, chokecherries, plums | <i>Prunus</i> spp. | 2 |
| Dogwoods | <i>Cornus</i> spp. | 2 |
| Elders, elderberries | <i>Sambucus</i> spp. | 3 |
| Hawthorns | <i>Crataegus</i> spp. | 4 |
| Hollies | <i>Ilex</i> spp. | 3 |
| Manzanitas | <i>Arctostaphylos</i> spp. | 7 |
| Mountain-ashes | <i>Sorbus</i> spp. | 2 |
| Wild roses | <i>Rosa</i> spp. | 3 |
| Snowberries, coralberries | <i>Symphoricarpos</i> spp. | 2 |
| Sumacs | <i>Rhus</i> spp. | 2 |
| Viburnums | <i>Viburnum</i> spp. | 2 |

ORNAMENTAL WOODY VINES

| | | |
|-----------------------------------|---------------------------|---|
| American or climbing bitter-sweet | <i>Celastrus scandens</i> | 2 |
| Blackberries | <i>Rubus</i> spp. | 3 |

| | | |
|--|-------------------------------|---|
| Crossvine | <i>Bignonia capreolata</i> | 6 |
| Yellow or Carolina jessamine | <i>Gelsemium sempervirens</i> | 7 |
| Common trumpet-creeper or trumpetvine. | <i>Campsis radicans</i> | 4 |

WOODY VINES FOR SCREENS, BANKS, AND GROUND COVER

| | | |
|--|------------------------------------|---|
| American or climbing bitter-sweet. | <i>Celastrus scandens</i> | 2 |
| Virginia creeper | <i>Parthenocissus quinquefolia</i> | 3 |
| Crossvine | <i>Bignonia capreolata</i> | 6 |
| Wild grapes | <i>Vitis</i> spp. | 2 |
| Greenbriers | <i>Smilax</i> spp. | 4 |
| Yellow or Carolina jessamine | <i>Gelsemium sempervirens</i> | 7 |
| Common trumpet-creeper or trumpetvine. | <i>Campsis radicans</i> | 4 |

WOODY VINES FOR WILDLIFE FOOD AND COVER

| | | |
|------------------|------------------------------------|---|
| Blackberries | <i>Rubus</i> spp. | 3 |
| Virginia creeper | <i>Parthenocissus quinquefolia</i> | 3 |
| Wild grapes | <i>Vitis</i> spp. | 2 |

HERBS FOR GROUND COVER AND EROSION CONTROL

FORBS

| | | |
|---------------|-------------------------|---|
| Clover, white | <i>Trifolium repens</i> | 3 |
|---------------|-------------------------|---|

| | | |
|---------------------|------------------------------|---|
| Ironweed | <i>Vernonia</i> spp. | 4 |
| Kudzu | <i>Pueraria lobata</i> | 6 |
| Lespedeza, sericea | <i>Lespedeza cuneata</i> | 5 |
| Periwinkle | <i>Vinca minor</i> | 4 |
| Sweetclover, yellow | <i>Melilotus officinalis</i> | 3 |
| Vetch, crown | <i>Coronilla varia</i> | 4 |
| Vetches | <i>Vicia</i> spp. | 3 |

GRASSES

| | | |
|---------------------|--|---|
| Bahiagrass | <i>Paspalum notatum</i> | 7 |
| Beachgrass | <i>Ammophila breviligulata</i> | 3 |
| Bermudagrass | <i>Cynodon dactylon</i> | 5 |
| Bluegrass, Canada | <i>Poa compressa</i> | 2 |
| Bluegrass, Kentucky | <i>Poa pratensis</i> | 3 |
| Brome, smooth | <i>Bromus inermis</i> | 3 |
| Buffalograss | <i>Buchloe dactyloides</i> | 3 |
| Fescue, Chewings | <i>Festuca rubra</i> var. <i>commutata</i> | 3 |
| Fescue, red | <i>Festuca rubra</i> | 3 |
| Fescue, tall | <i>Festuca arundinacea</i> | 3 |
| Gramma, blue | <i>Bouteloua gracilis</i> | 3 |
| Lovegrasses | <i>Eragrostis</i> spp. | 4 |
| Orchardgrass | <i>Dactylis glomerata</i> | 3 |
| Redtop | <i>Agrostis alba</i> | 2 |
| Ryegrass | <i>Lolium</i> spp. | 3 |
| St. Augustinegrass | <i>Stenotaphrum secundatum</i> | 7 |

| | | |
|--------------------------|---------------------------------|---|
| Squirreltail | <i>Sitanion hystrix</i> | 3 |
| Timothy | <i>Phleum pratense</i> | 2 |
| Uniola, broadleaf | <i>Uniola latifolia</i> | 5 |
| Wheatgrass, bluebunch | <i>Agr. pyron. spicatum</i> | 2 |
| Wheatgrass, crested | <i>Agr. pyron. desertorum</i> | 2 |
| Wheatgrass, intermediate | <i>Agr. pyron. intermedium</i> | 3 |
| Wheatgrass, slender | <i>Agr. pyron. trachycaulum</i> | 2 |
| Wheatgrass, tall | <i>Agr. pyron. elongatum</i> | 3 |
| Wheatgrass, western | <i>Agr. pyron. smithii</i> | 3 |

HERBS FOR BEAUTY ACCENTS

FORBS

| | | |
|----------------------|-----------------------------------|---|
| Arrowleaf balsamroot | <i>Balsamorhiza sagittata</i> | 3 |
| Aster, large-leaved | <i>Aster macrophyllus</i> | 3 |
| Aster, New England | <i>Aster novae-angliae</i> | 3 |
| Aster, red-stalked | <i>Aster puniceus</i> | 3 |
| Beardtongue | <i>Penstemon</i> spp. | 4 |
| Beargrass | <i>Xerophyllum tenax</i> | 2 |
| Black-eyed susan | <i>Rudbeckia hirta</i> | 3 |
| Butterfly weed | <i>Asclepias tuberosa</i> | 4 |
| Clover, red | <i>Trifolium pratense</i> | 3 |
| Daisy | <i>Chrysanthemum leucanthemum</i> | 3 |
| Goldenrod | <i>Solidago</i> spp. | 3 |

| | | |
|-----------------------|----------------------------------|---|
| Harebell | <i>Campanula rotundifolia</i> | 2 |
| Lupine | <i>Lupinus</i> spp. | 3 |
| Monkey flower, common | <i>Mimulus guttatus</i> | 2 |
| Monkey flower, dwarf | <i>Mimulus nanus</i> | 3 |
| Monkey flower, Lewis | <i>Mimulus lewisii</i> | 3 |
| Paintbrush, Indian | <i>Castilleja</i> spp. | 2 |
| Pea, partridge | <i>Cassia fasciculata</i> | 5 |
| Pea, wild | <i>Lathyrus</i> spp. | 3 |
| Phlox, wild | <i>Phlox</i> spp. | 4 |
| Poppy, California | <i>Eschscholtzia californica</i> | 7 |
| Sweetvetch | <i>Hedysarum</i> spp. | 3 |
| Vetch, milk | <i>Astragalus</i> spp. | 3 |
| Violet | <i>Viola</i> spp. | 2 |

GRASSES

| | | |
|-----------------------|-------------------------------|---|
| Gramma, sideoats | <i>Bouteloua curtipendula</i> | 3 |
| Natalgrass | <i>Rhynchelytrum roseum</i> | 7 |
| Oats, sea | <i>Uniola paniculata</i> | 6 |
| Pampasgrass | <i>Cortaderia selloana</i> | 6 |
| Plumegrass, sugarcane | <i>Erianthus giganteus</i> | 5 |
| Reed, giant | <i>Arundo donax</i> | 7 |
| Ricegrass, Indian | <i>Oryzopsis hymenoides</i> | 3 |
| Satintail | <i>Imperata brevifolia</i> | 7 |
| Silvergrass | <i>Miscanthus sinensis</i> | 7 |

SELECTED REFERENCES

- American Association of State Highway Officials. A policy on landscape development for the national system of interstate and defense highways. Washington, D.C. 1961.
- Barrett, John W. Regional silviculture of the United States. The Ronald Press Co., New York. 1962.
- Benneth, J. M. Roadsides, the front yard of the nation. The Stratford Co., Boston. 1936.
- California Department of Public Works. California roadsides. Sacramento. 1961.
- Dayton, William A. Notes on western range forbs. U.S. Dept. Agr. Agriculture Handbook 161. Washington, D.C. 1960.
- Eckbo, Garrett. Landscape for living. F. W. Dodge Corp., New York. 1950.
- Frank, Robert M. A guide for screen and cover planting of trees on anthracite mine-spoil areas. U.S. Forest Service, Upper Darby, Pa. 1964.
- George, Ernest J. Shelterbelts for the northern Great Plains. U.S. Dept. Agr. Farmers' Bulletin 2109. Washington, D.C. 1961.
- Grimm, William Carey. The book of shrubs. The Stackpole Co., Harrisburg, Pa. 1957.
- Haller, John H. Tree care. The Macmillan Co., New York. 1957.
- Hawley, R. C. and Smith, D. M. The practice of silviculture. John Wiley and Sons, New York and London. 1960.
- Highway Research Board. Bibliography on roadside development and beautification. National Academy of Sciences. Washington, D.C. 1965.
- Hitchcock, A. S. and Chase, Agnes. Manual of grasses of the United States. U.S. Dept. Agr. Miscellaneous Publication 200. Washington, D.C. 1950.
- Lindstrom, G. A. Forestation of strip-mined lands in the Central States. U.S. Dept. Agr. Agriculture Handbook 166. Washington, D.C. 1960.
- Martin, Alexander C., Zim, Herbert S., and Nelson, Arnold L. American wildlife and plants: a guide to wildlife food habits. Dover Publications, Inc., New York. 1951.
- Read, Ralph A. Tree windbreaks for the central Great Plains. U.S. Dept. Agr. Agriculture Handbook 250. Washington, D.C. 1964.
- Rehder, Alfred. Manual of cultivated trees and shrubs hardy in North America. The Macmillan Co., New York. 2d edition, 1940.
- Salomon, Julian Harris. Campsite development. Girl Scouts of the U.S.A., New York. 1959.
- Sargent, Charles Sprague. Manual of the trees of North America. Houghton Mifflin, Boston and New York. 1933.
- Shomon, Joseph J. A nature center for your community. National Audubon Society. New York. 1962.
- Simonds, John Ormsbee. Landscape architecture, the shaping of man's natural environment. F. W. Dodge Corp., New York. 1961.
- Stoddart, L. A. and Smith, A. D. Range management. McGraw-Hill, New York. 1955.
- Tilden, Freeman. Interpreting our heritage. The University of North Carolina, Chapel Hill. 1957.
- Van Dersal, William R. Native woody plants in the United States, their erosion-control and wildlife values. U.S. Dept. Agr. Miscellaneous Publication 303. Washington, D.C. 1939.
- Wakeley, Philip C. Planting the southern pines. U.S. Dept. Agr. Forest Service, Agr. Monograph 18. Washington, D.C. 1954.
- Wallin, Harold E. Interpretation, a manual and survey on establishing a naturalist program. American Institute of Park Executives. Wheeling, W. Va. 1963.
- Wisconsin Department of Resource Development. Recreation in Wisconsin. Madison, Wis. 1962.
- Wyman, Donald. Hedges, screens, and windbreaks. Whittlesey House. New York and London. 1938.
- . Ground cover plants. The Macmillan Co. New York. 1956.
- . Trees for American gardens. Macmillan Press. 1959.
- U.S. Department of Agriculture. A manual on conservation of soil and water. Agriculture Handbook 61. Washington, D.C. 1954.
- . Developing the self-guiding trail in the national forests. Miscellaneous Publication 968. Washington, D.C. 1964.
- . Pruning shade trees and repairing their injuries. Home and Garden Bulletin 83. Washington, D.C. 1962.
- . Range plant handbook. Washington, D.C. 1937.
- . Silvics of forest trees of the United States. Agriculture Handbook 271. Washington, D.C. 1965.
- . Yearbook of Agriculture. Grass. Washington, D.C. 1948.
- . Yearbook of Agriculture. Trees. Washington, D.C. 1949.



SOURCES OF ASSISTANCE

This booklet outlines some general principles and guides for land beautification. Many interested readers will need more detailed information that applies to their local or specific situation. Numerous public and private agencies are sources of pertinent professional and technical assistance.

Within the U.S. Department of Agriculture, for example, agencies such as the Soil Conservation Service, Agricultural Research Service, Federal Extension Service, and Forest Service furnish information on good land management practices, vegetation establishment and maintenance, and on design of roads, recreation areas, and related structures. Local employees of these agencies can be very helpful in recommending species for local conditions, sources of seed, and methods of planting.

Similarly, the National Park Service, Bureau of Land Management, and Bureau of Indian Affairs of the U.S. Department of the Interior, and the Bureau of Public Roads of the U.S. Department of Commerce provide planning and management information.

Assistance may also be obtained from your State forester and other State agencies such as the extension service, highway department, agricultural experiment station, division of parks, and fish and game department. Other competent sources include county and city resource managers, local landscape architects, nurserymen, seed dealers, women's clubs, garden clubs, conservation organizations, consulting foresters, and forest industry associations and representatives.



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our programs, our building and our growth,
a conscious and active concern for the values
of beauty.”*

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President of the United States





